

TM 9-1275

★ RESTRICTED

WAR DEPARTMENT

TECHNICAL MANUAL



ORDNANCE MAINTENANCE

U. S. RIFLE, CAL. .30, M1

NOVEMBER 6, 1942

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WAR DEPARTMENT
Washington, November 6, 1942

ORDNANCE MAINTENANCE

U. S. RIFLE, CAL. .30, M1

Prepared under direction
of the
Chief of Ordnance

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TM 9-1275
1942
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*This manual supersedes TM 9-1275, December 15, 1941; TB 1275-1, January 1, 1942; TB 1275-2, July 22, 1942 and TB 1275-3, December 3, 1942.

ORDNANCE MAINTENANCE—U. S. RIFLE, CAL. .30, M1

Section I

INTRODUCTION

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1. SCOPE.

a. This manual is published for the information and guidance of ordnance maintenance personnel. It contains detailed instructions for inspection, disassembly, assembly, maintenance, and repair of the U. S. Rifle, cal. .30, M1, the Bayonet M1905, Bayonet Scabbard M3, Bayonet Scabbard M1910, and Gun Sling M1907. These instructions are supplementary to those in the field manuals prepared for the using arms. Additional descriptive matter and illustrations are included to aid in providing a complete working knowledge of the materiel.

2. DATA.

a. The U. S. Rifle, cal. .30, M1 fires cal. .30 cartridges in clips of 8 rounds. It is a gas-operated weapon fired semiautomatically.

Weight	9.5 lb
With Bayonet M1905	10.5 lb
Length (over-all)	43.6 in.
Length of barrel	24 in.
Length of rifling	70.8 cal.; 21.30 in.
Rifling	
Number of grooves	4
R.H. twist; 1 turn in	33.3 cal.; 10 in.
Depth of grooves	0.0040 in.
Cross-sectional area of bore	0.0740 sq in.
Type of mechanism	Gas-operated, semiautomatic
Loading device	Clip
Rate of fire	Semiautomatic
Cooling	Air
Sight radius	27.9 in. at 100 yd range
Trigger pull	7.5 lb max; 4.5 lb min
Normal pressure	50,000 lb per sq in. (copper)
Ammunition types	Ball, A. P., tracer.
Cartridge, ball type	Cal. .30, M2
Approximate maximum range for	
Cartridge M2 (standard)	3,450 yd

INTRODUCTION

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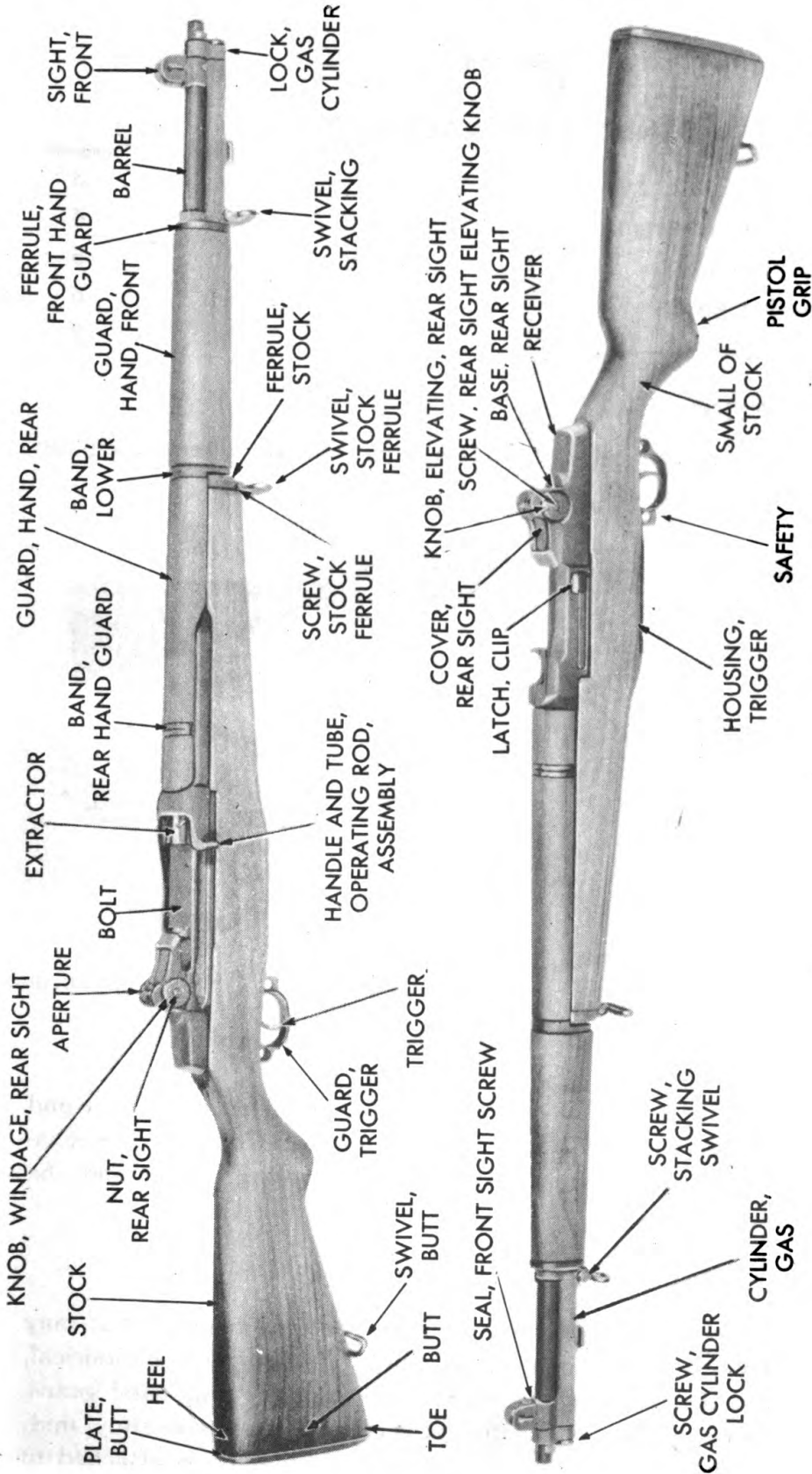


Figure 1 - U.S. Rifle, Cal. .30, M1 - Right and Left Views

ORDNANCE MAINTENANCE—U. S. RIFLE, CAL. .30, M1

Section II

GENERAL CHARACTERISTICS

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Description	3
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Trigger housing group	6
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3. DESCRIPTION.

a. The U. S. Rifle, cal. .30, M1 is a gas-operated, semiautomatic shoulder weapon (figs. 1, 2, and 3).

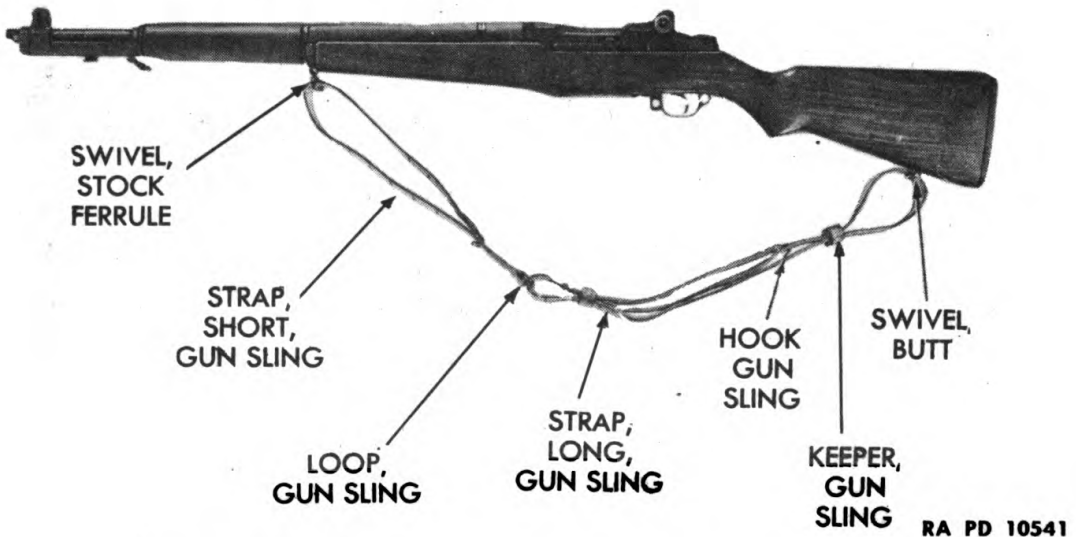


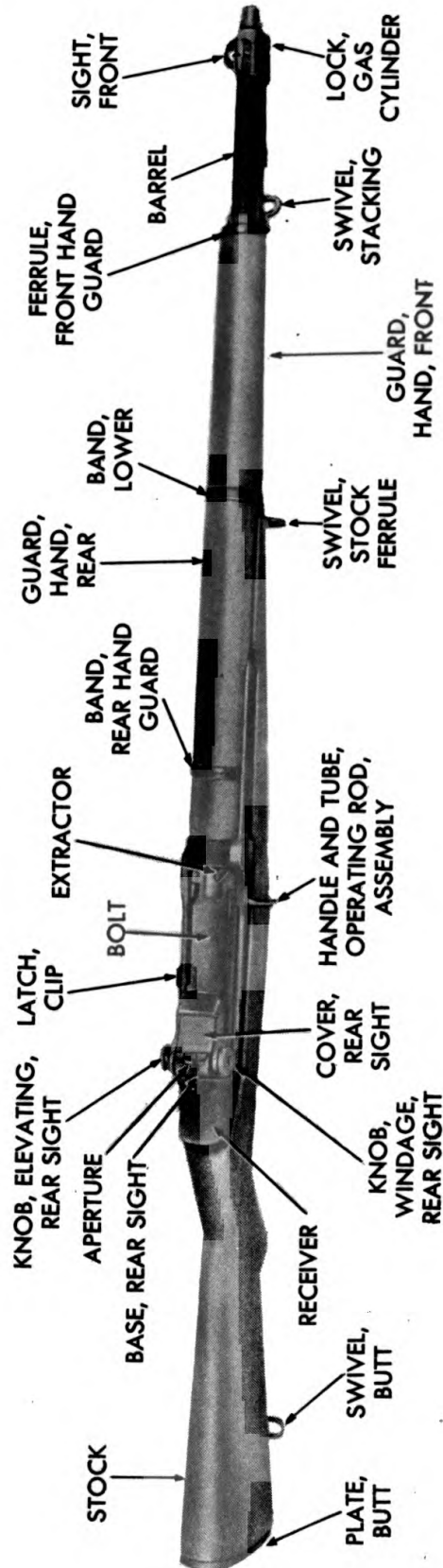
Figure 2 — U.S. Rifle, Cal. .30, M1 with Sling — Left View

b. The rifle is composed of four main assemblies: the barrel and receiver assembly, the latter including the bolt and operating mechanism; the gas cylinder assembly; the trigger housing group; and the stock assembly.

4. BARREL AND RECEIVER ASSEMBLY.

a. The barrel and receiver are securely fastened together but may be separated when replacement is necessary. The barrel is cylindrical, tapered toward the muzzle, and grooved to retain the rear hand guard. The gas cylinder is located at the forward end. Approximately midway along the length of the barrel, a pinned lower band is attached to

GENERAL CHARACTERISTICS



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Figure 3 — U.S. Rifle, Cal. .30, M1 — Top View

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retain the front hand guard, the front flange of the rear hand guard, and the front end of the stock.

b. The receiver is of one-piece design, open at the top and bottom. It contains the bolt, cartridge clip (when inserted), the follower, follower slide, and other parts of the operating mechanism (figs. 4 and 5). The trigger assembly is attached to it by the engagement of lugs on the trigger guard with corresponding lugs on the inner faces of the receiver.

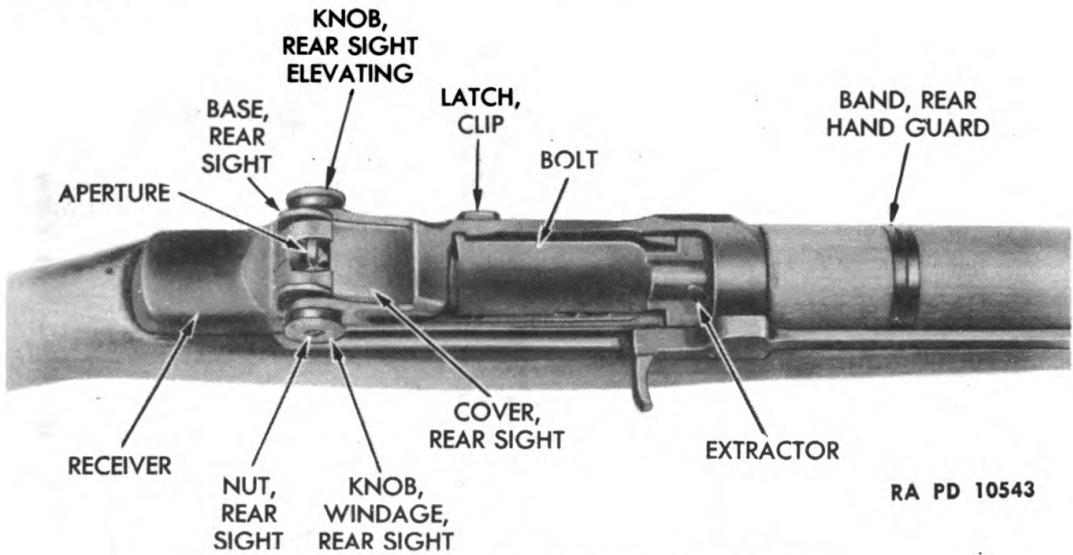


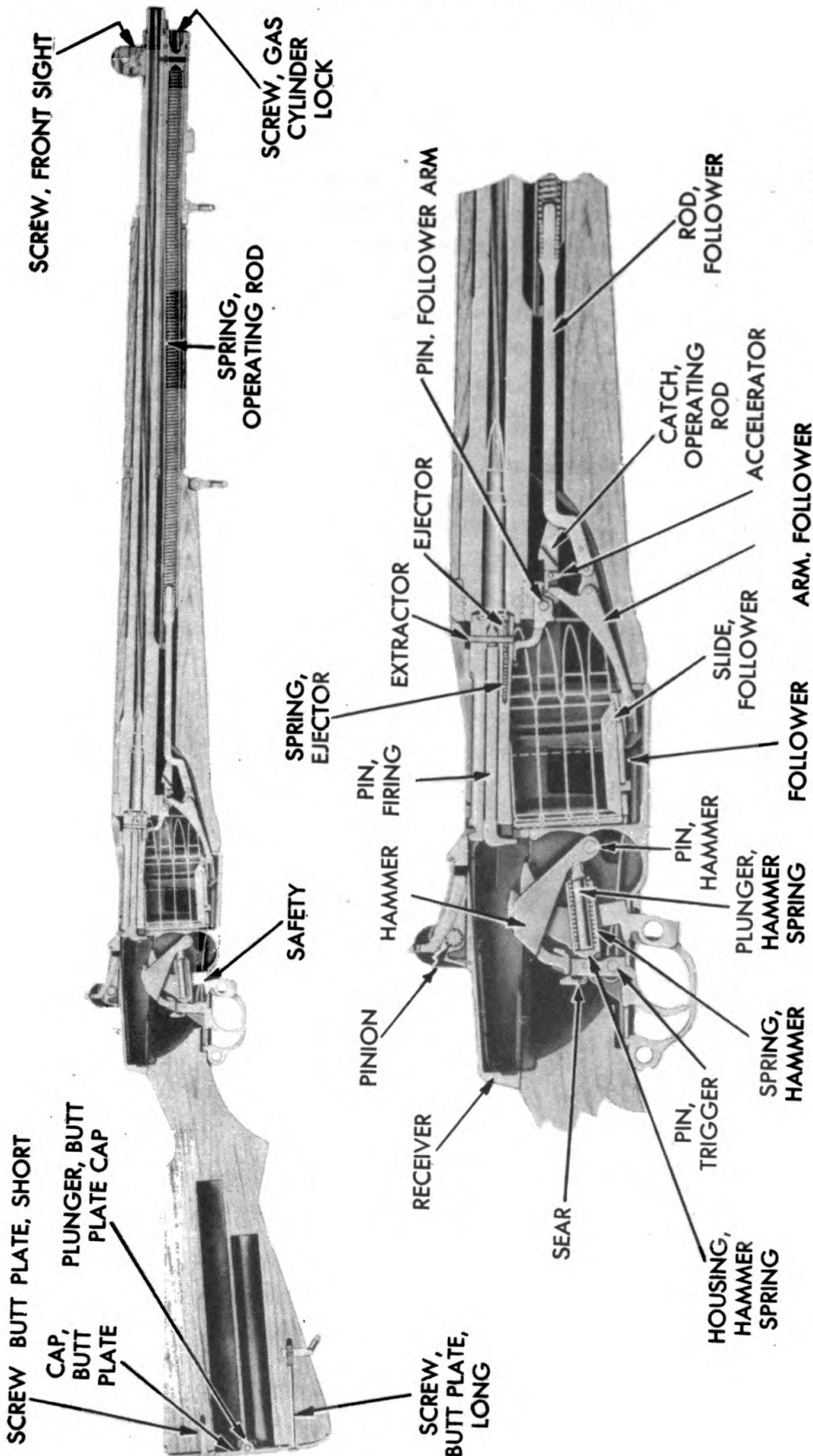
Figure 4 — Receiver Section — Top View

c. In the inner sides of the top of the receiver are parallel bolt guide grooves in which the bolt moves. As the bolt comes to the end of its forward movement, it is cam-rotated by the rear or slide part of the operating rod. This rotation of the bolt forces the lugs on the bolt into openings in the receiver, thereby locking the bolt to the receiver prior to firing.

d. On the right outer side of the receiver is the operating rod retaining groove. A lug on the rear end of the operating rod moves in the retaining groove when the rod is actuated by gas from the gas cylinder on recoil or the operating rod spring in forward movement. On the upper portion of the operating rod retaining groove near the rear end is a relief cut to permit disengaging the rod from the receiver.

e. The operating rod includes the handle, tube, and piston welded together. The piston on the forward end operates in the gas cylinder on the under side of the barrel. The lug on the handle moves in its groove on the right outside face of the receiver. The function of the handle portion of the rod is to move backward and forward, unlocking

GENERAL CHARACTERISTICS



RA PD 10544

Figure 5 — Rifle and Receiver — Sectional View

ORDNANCE MAINTENANCE— U. S. RIFLE, CAL. .30, M1

and locking the bolt in the receiver, at the proper time. The bolt in turn cocks the hammer on its rearward movement and pushes the cartridge into the chamber on its forward movement. The force to accomplish these actions is provided by gas pressure transmitted from the barrel to the gas cylinder. This pressure forces the piston of the operating rod backward against the force exerted by the operating rod spring. When the gas pressure decreases sufficiently between successive discharges, the thrust of the operating rod spring forces the rod forward. The operating rod is provided with a handle for retracting the bolt on initial loading or in case of a misfire.

f. The operating rod spring is of round cross-section wire slightly tapered at the rear end to fit on the follower rod. The rear end of this rod bears against the follower arm on the base of the receiver. (Two earlier designs vary slightly. The original one consists of an operating rod spring of keystone cross-section wire, which is of uniform outside diameter, used with a follower rod and compensating spring of round or square cross-section wire. A later type consists of a similar operating rod spring used with a modified follower rod without the compensating spring.)

g. The rear of the receiver is extended to provide a surface fitting with the stock. This holds the rear end of the barrel and receiver group to the stock when squeezed by the pressure of the locking lugs of the trigger guard.

h. The bolt contains the firing pin, the extractor, and the ejector with their related springs and plungers. It is connected to the operating rod by a lug on its right side, which mates with a camming recess in the inner face of the operating rod. This lug and one similarly placed on the left side of the bolt are locking lugs which engage in locking cuts in the receiver.

i. The extractor is of the claw type. It is seated in the forward end of the bolt and actuated by a plunger and spring.

j. The ejector is seated in a well in the forward end of the bolt. It is locked in position by the extractor and actuated by a spring.

k. The firing pin is seated in a well in the center of the bolt and is retained in place by the extractor. It has a tang on the rear end which blocks it from functioning until the bolt is locked.

l. In the bridge of the receiver is a cut with which the tang of the firing pin must mate in order to move forward in the bolt. This mating cannot be accomplished until the bolt is rotated to the locked position.

TECHNICAL MANUAL ORDNANCE MAINTENANCE

U. S. RIFLE, CAL. .30, M1

CHANGES }
No. 1 }

WAR DEPARTMENT,
WASHINGTON, May 15, 1943.

TM 9-1275, November 6, 1942, is changed as follows:

2. Data. a.

* * * * *

Rifling

Number of grooves----- 2(rifles of new manufacture)
4 (rifles of old manufacture)

R. H. twist; 1 turn in----- 33.3 cal.; 10 in.

* * * * *

[A. G. 062.11 (4-20-43).] (C 1, May 15, 1943.)

77. Assembly of gas cylinder group (spline type).

* * * * *

b. Place the gas cylinder lock over the barrel with the lug forward and screw into position. In order to bring the lock into correct alinement, proceed as follows:

(1) Screw lock down as far as possible. Do not force.

(2) Unscrew lock a fraction of a turn to the left until the screw hole in the lock lines up with the threaded hole in the gas cylinder, permissisg assembly of the gas cylinder lock-screw.

(3) Turn screw in several threads with the fingers only.

(4) Push the gas cylinder lightly toward the muzzle until it rests against the lock.

c. (Superseded.) Tighten the lock screw so it cannot work loose while firing. A torque of 17 to 20 foot pounds or a pressure of approximately 50 pounds applied to each end of a combination tool will be required to tighten lock screw properly.

* * * * *

[A. G. 062.11 (4-20-43).] (C 1, May 15, 1943.)

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
*Major General,
The Adjutant General.*

GENERAL CHARACTERISTICS

m. Within the receiver are the follower with its slide, the follower arm, the operating rod catch to which the accelerator is pinned, and the bullet guide. The follower arm, operating rod catch assembly, and bullet guide are all attached to the receiver by the follower arm pin, which serves as the pivot for the arm and rod catch.

n. Small lugs on the long end of the follower arm slide in grooves in the follower, which in turn slides vertically in grooved ways in the receiver. Movement of the arm thus moves the follower up and down in the receiver. The force necessary to cause the upward movement of the arm and follower is provided by the operating rod spring which also provides the force necessary to cause upward pressure on the operating rod catch. The operating rod catch only functions when the last round in the clip has been fired. It then engages the rod and holds the bolt open, ready for another loaded clip.

o. The clip latch is mounted in a groove on the left face of the receiver. It pivots on a long pin which passes through lugs on the receiver at both ends of the latch. The rear end of the latch has a thumb piece under which a spring bears against the latch and receiver, normally holding the latch away from it. The clip latch is provided so that a clip may be removed at any time desired. The empty clip is automatically ejected on the last round by the clip ejector.

p. On the top of the rear end of the receiver is the rear sight group composed of a base, cover, aperture, pinion, elevation and windage knobs with retaining screws and nuts. The aperture is a curve-shaped piece, with a rack on the under side, sliding in grooved ways in the base. It is actuated by a pinion so that rotation of the pinion by the elevation knob on the left side of the sight raises and lowers the aperture. Windage adjustment is obtained by rotating the knob on the right side of the sight. This moves the aperture and base sidewise on the rear of the receiver.

q. The cover on the rear sight has a concave depression laterally across the cover between two similar concave depressions running longitudinally along each side. This construction provides a more positive spring action. (In an older type cover, the stiffening ridge was a lateral step-down continuing all the way across the cover.)

5. GAS CYLINDER GROUP.

a. A gas cylinder is attached to the front end of the barrel and includes the front sight and means of attachment to the barrel. A gas port, located a short distance back of the muzzle of the barrel, conveys gas under pressure to a cylinder mounted just under the barrel and in which

ORDNANCE MAINTENANCE—U. S. RIFLE, CAL. .30, M1

the operating rod piston operates. There are two types of gas cylinder groups:

(1) **SPLINE TYPE GAS CYLINDER GROUP.** In the spline type gas cylinder, the barrel protrudes beyond the cylinder and the front sight screw enters from the rear. It is sealed to prevent tampering. The cylinder is slid onto the end of the barrel and is retained by threads over which the gas cylinder lock is screwed. A gas cylinder lock screw performs the dual purpose of holding the gas cylinder lock in position and preventing the escape of gases from the front end of the cylinder.

(2) **SCREW-ON TYPE GAS CYLINDER GROUP.** In this older type of gas cylinder, the barrel does not protrude and the front sight screw enters from the side. In this type of gas cylinder, the port which bypasses the gases from the muzzle of the barrel to the cylinder is an integral part of the gas cylinder. Accurate alinement between the muzzle and the end of the cylinder must be maintained.

6. TRIGGER HOUSING GROUP.

a. The trigger assembly is composed of the trigger housing, trigger, trigger guard, hammer and sear, safety, and their component springs and pins. The housing is attached to the receiver by means of lugs which are engaged by lugs on the trigger guard. The guard in turn is retained in position on the housing by the same pin which retains the hammer. When the lugs of the receiver are engaged by those on the trigger guard, a light squeezing action also retains the stock to the receiver by means of lips on the trigger housing.

b. The trigger and sear rotate about the trigger pin and the hammer about the hammer pin. The hammer spring is enclosed in a tubular hammer spring housing which is open on the side next to the safety. A clevis on the rear end of the housing is pinned to the trigger.

c. The safety is pivoted in a hole in the left side of the trigger housing. A lug on the side of the safety performs the function of a pin. The lower end of the safety extends downward through the housing into an opening in the trigger guard. In this position, it is readily accessible to the trigger finger of the operator. The safety is held in the "ON" and "OFF" positions by means of a spring engaged in the trigger housing just below the lower face of the safety.

d. The clip ejector is mounted under a lug on the inner left face of the trigger housing. It consists of a looped spring, one end of which extends forward through the housing so that it bears against the cartridge clip.

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7. STOCK AND SLING GROUP.

a. This group is composed of the stock in which the barrel and receiver are bedded, the front hand guard, rear hand guard, butt plate, swivels, and sling. The front hand guard is positioned on top of the barrel. Its front end is held in place by the gas cylinder while its rear end is held by the lower band. The rear hand guard is mounted between the lower band and the front end of the receiver. The butt plate is attached to the rear end of the stock.

b. The butt plate is recessed, and the butt set into the plate. The hinged trap cover of the butt plate allows access to two wells in the butt for carrying the combination tool, oiler, and thong. (Earlier type rifles have a plain butt plate mounted flat on the butt end without trap.)

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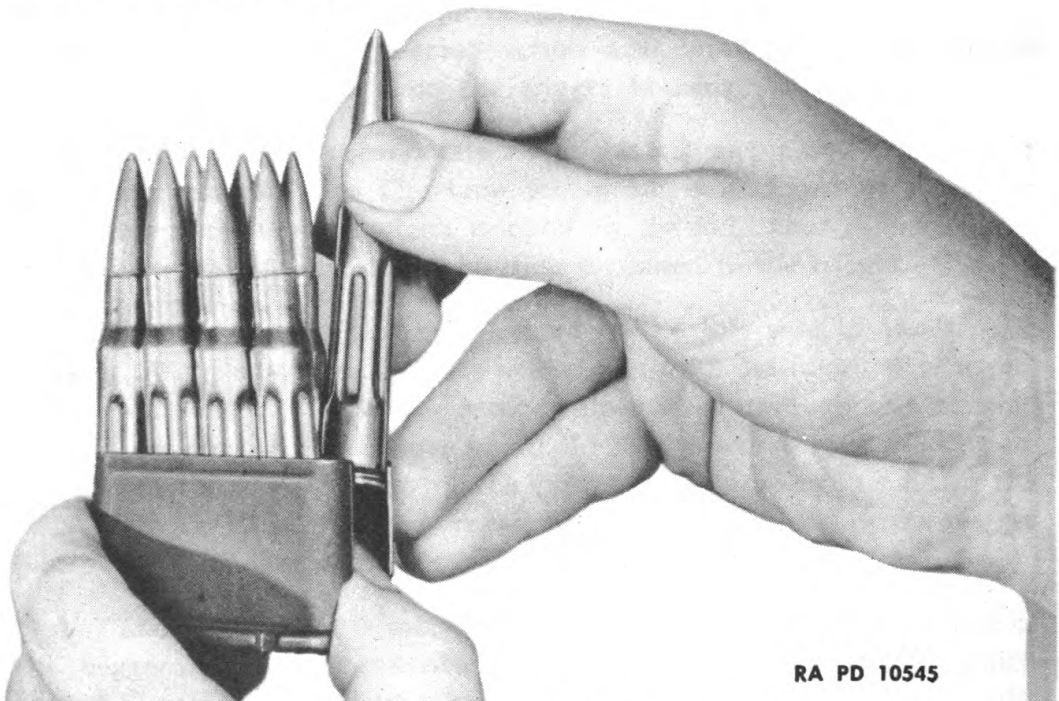
Section III

OPERATION AND FUNCTIONING

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Rearward movement of operating rod	12
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Forward movement of operating rod	14
Automatic ejection of empty cartridge clip	15
To unload rifle	16
Operation of rifle as single loader	17
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8. LOADING THE CARTRIDGE CLIP (fig. 6).

a. Eight rounds are inserted in the cartridge clip so that the base of each cartridge rests on the rear wall of the clip and the extractor groove in the cartridge engages the inner rib of the clip. Unless the base of each cartridge is against the rear wall of the clip, one or more cartridges may protrude so far forward that insertion of the clip in the receiver of the rifle is prevented.



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Figure 6 — Loading Clip with Dummy Cartridges

OPERATION AND FUNCTIONING**9. LOADING THE RIFLE (fig. 7).**

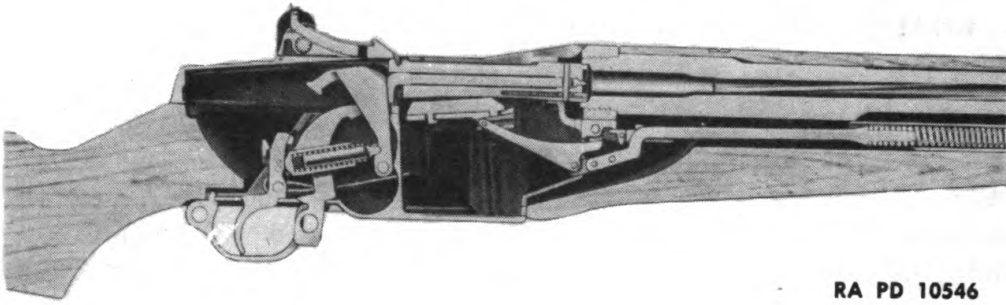
a. The operation of loading is performed with the rifle locked, i.e., with the safety of the rifle in its rearmost position except in sustained firing. Hold the rifle at the balance in the left hand. With the forefinger of the right hand, pull the operating rod handle smartly to the rear until the operating rod is caught by the operating rod catch. With the right hand, take a fully loaded clip and place it on top of the follower. Close the hand into a fist with the thumb extended. Raise the elbow high, and with the ball of the thumb on top of the clip at its front end (about the middle of the top cartridge), press the clip down into the receiver until it engages the clip latch. Swing the thumb to the right so as to clear the bolt in its forward movement. The closing of the bolt may be assisted by striking forward on the operating rod handle with the heel of the right hand. (The rearward movement of the operating rod also moves the bolt rearward, cocking the hammer.)

b. With a little practice, the loading into the receiver of a clip containing less than eight rounds can be accomplished as easily as loading a full clip. Using the right forefinger to hold the cartridges down against the bottom lips of the clip, the partially loaded clip is placed on top of the follower. The cartridges are held in place and the clip allowed to drop down until the top cartridges are against the upper lips of the clip. Then, with the right thumb on top of the cartridges and the right side of the right hand pressing the operating rod handle slightly to the rear, press the clip down into the receiver until it engages the clip latch. Swing the thumb to the right so as to clear the bolt in its forward movement. Release the operating rod handle. The closing of the bolt may be assisted by striking the operating rod handle forward with the heel of the right hand.

10. AUTOMATIC RELEASE OF OPERATING ROD CATCH.

a. When the loaded clip is forced down in the receiver, it depresses the follower. As the follower nears the bottom of the receiver, the front end of the follower arm contacts and rotates the accelerator. The accelerator, in rotating about its pin in the operating rod catch, bears on a lug on the bullet guide and forces down the front end of the operating rod catch, thus releasing the operating rod. The operating rod is then moved forward by the pressure of the operating rod spring. At the same time, the rear arm of the operating rod catch swings upward and releases the stud on the front end of the clip latch. The clip latch then rotates under the pressure of its spring so that its rear lug moves inward to engage the notch in the clip and retain the clip in the magazine.

b. Simultaneously with the forward movement of the operating rod,

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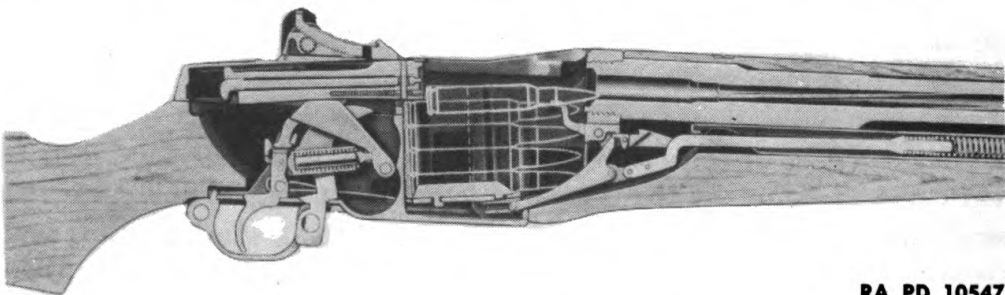
RA PD 10546

Figure 7 — Receiver Without Clip, Ready for Cocking, Hammer Down — Sectional View

the forward end of the bolt engages the edge of the rear face of the uppermost cartridge in the clip and pushes it forward. The nose of the bullet strikes the beveled face of the chamber, guiding the nose into the chamber as the bolt continues to move forward (fig. 8).

c. Further forward movement of the bolt causes the extractor to engage the extractor groove in the base of the cartridge, forcing the ejector into the bolt. The bolt is also rotated clockwise by the camming recess in the operating rod. The locking lugs on the right and left sides of the bolt then engage the corresponding locking recesses in the receiver.

d. When the rifle is loaded and the bolt closed (fig. 9), the hammer spring is compressed and the trigger lugs are engaged in the hammer hooks, holding the hammer in cocked position. Before the rifle can be fired the safety must be released. When the trigger is pulled the trigger lugs are disengaged from the hammer hooks and the released hammer, moved by its spring, strikes the firing pin which in turn hits the primer of the cartridge (fig. 10). The bolt, however, must be locked before this action can take place, since the tang of the firing pin is blocked by the bridge of the receiver except when it is aligned with the slot in the



RA PD 10547

Figure 8 — Receiver with Hammer in Cocked Position, Bolt Retracted, Cartridge Entering Chamber — Sectional View

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bridge. Also, unless the bolt is locked, the hammer is prevented from striking the firing pin by the bolt camming lug, which projects from the face of the hammer. The hammer can strike the firing pin only when this lug (on the hammer) can drop into the cam surface cut in the rear face of the bolt. The shape of this surface is such that the bolt, if not already locked, will be fully closed and locked by a positive cam action when the hammer falls. The safety must be in its foremost position so that it does not block the hammer and trigger.

11. GAS ACTION.

a. When the bullet passes the gas port (fig. 11) some of the expanding gas passes through the port into the gas cylinder, where it acts on the piston end of the operating rod with sufficient force to drive the operating rod to the rear and compress the operating rod spring (fig. 12).

12. REARWARD MOVEMENT OF OPERATING ROD.

a. The initial movement of the operating rod to the rear for about $\frac{5}{16}$ inch is independent of the bolt mechanism. The operating rod recess merely slides past the lug on the bolt. The cam surface of this recess then comes in contact with the bolt lug and cams it up, rotating the bolt counterclockwise and disengaging the locking lugs on the bolt from their

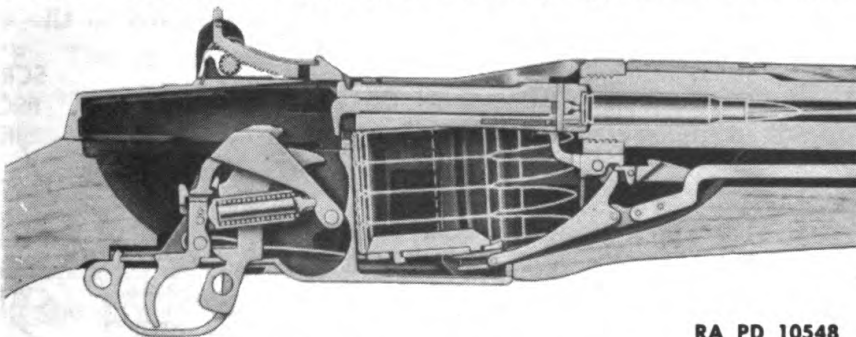


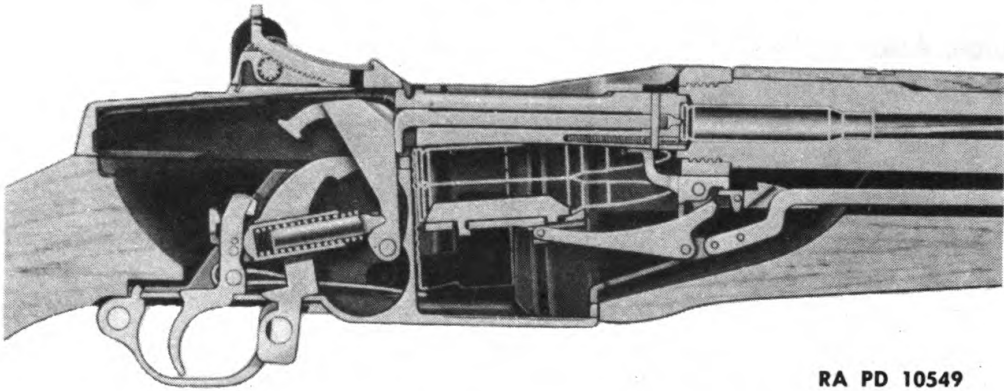
Figure 9 — Receiver with Bolt Closed, Cartridge in Chamber, Hammer Locked by Safety — Sectional View

recesses in the receiver. During this delay between the initial movement of the operating rod and the unlocking of the bolt the bullet leaves the muzzle, thus relieving the gas pressure in the barrel before the bolt is opened. The rotation of the bolt also cams the hammer back from the firing pin and withdraws the firing pin point into the bolt.

13. EJECTION OF EMPTY CARTRIDGE CASE.

a. As the operating rod continues its movement to the rear it carries the bolt which slides along the receiver. The empty cartridge case is

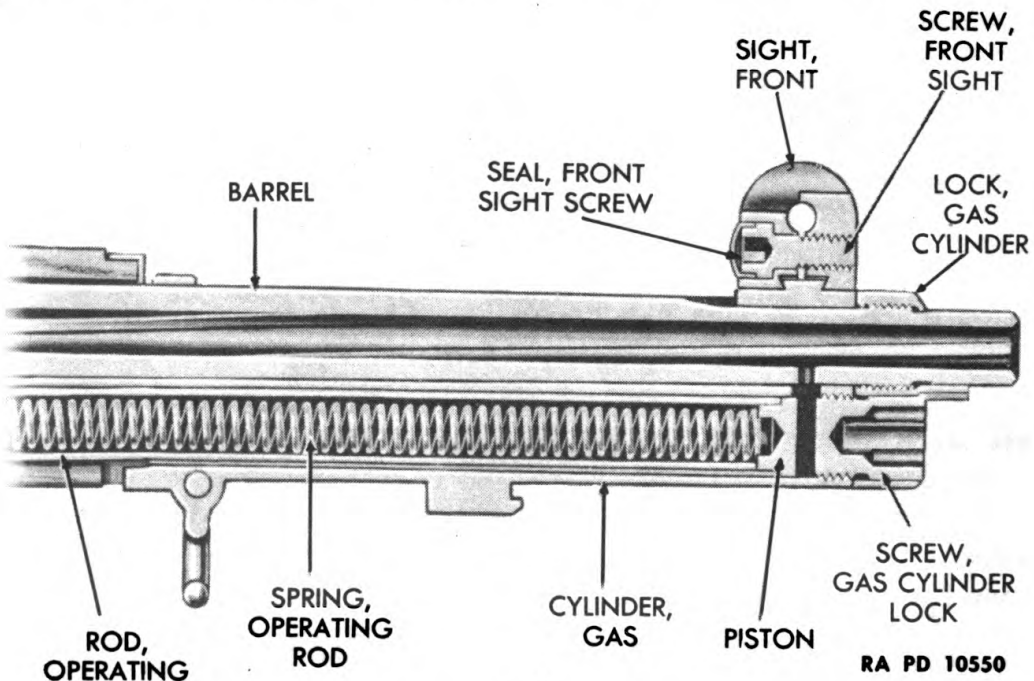
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RA PD 10549

Figure 10 — Receiver with Cartridge in Chamber, Hammer Down, Firing Pin Striking Cartridge — Sectional View

withdrawn from the chamber by the extractor (fig. 12). When the mouth of the empty cartridge case clears the breech, the ejector, which is continually pressing on the base of the cartridge, ejects the empty case to the right front through the action of the compressed ejector spring. The rear end of the bolt forces the hammer back and rides over it, thus compressing the hammer spring, and finally comes to rest near the rear end of the receiver. With the bolt at its extreme rearward position, the magazine is again uncovered. The follower, actuated by the follower arm and the follower rod, which transmits pressure from the operating rod spring then forces the cartridges upward in the clip so



RA PD 10550

Figure 11 — Barrel and Spline Type Gas Cylinder Before Firing

OPERATION AND FUNCTIONING

that the top cartridge lies in the path of the bolt. The rearward movement of the operating rod stops when the rear end of its broad curved section contacts the front face of the receiver.

14. FORWARD MOVEMENT OF OPERATING ROD.

a. As the bolt moves forward, actuated by the compressed operating rod spring, the lower front face of the bolt comes in contact with the base of the next cartridge and slides it forward into the chamber.

b. The hammer, under pressure from the hammer spring, rides on the bottom of the bolt and tends to follow it, but is caught and held by the trigger lugs which engage the hammer hooks thus retaining the hammer in the cocked position. If, however, the trigger has not been released, the sear will engage the rear hammer hooks. Release of the trigger disengages the sear from the hammer and permits the hammer hooks to engage with the trigger lugs.

c. When the bolt approaches its forward position, the rim of the cartridge is engaged by the extractor. The base of the cartridge then forces the ejector into the bolt thus compressing the ejector spring. The operating lug is cammed downward by the rear surface of the cam recess in the operating rod, and the bolt rotated as before to engage the locking lugs in the receiver. This action again locks the bolt.

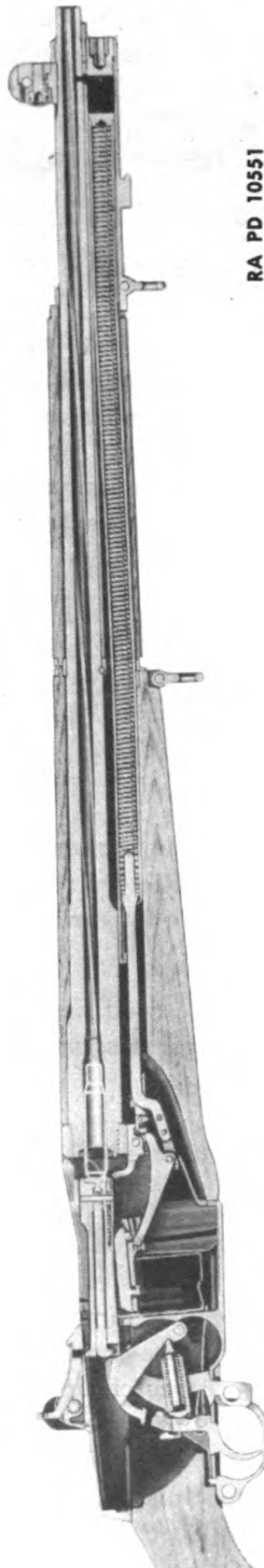
NOTE: The compensating spring in earlier designs of the rifle was used to prevent the hooks on the follower rod from becoming disengaged from the follower arm during the forward movement of the operating rod.

d. The rifle is then ready to be fired again. The cycle described above is repeated each time the trigger is squeezed, except after the last round in the clip is fired.

15. AUTOMATIC EJECTION OF EMPTY CARTRIDGE CLIP.

a. When the last round of a clip is fired, the bolt clears the top of the receiver in its movement to the rear as before, but since the clip is empty, the follower is pushed up to its extreme top position by the action of the follower arm, follower rod, and operating rod spring. The position of the follower rod under these conditions is such that it cams the forward end of the operating rod catch upward to engage the notch in the operating rod. At the same time, the rear arm of the operating rod catch pivots about the follower arm pin and forces down the stud on the front end of the clip latch, thus rotating the clip latch and disengaging it from the clip. Thereupon the empty clip is ejected by the

ORDNANCE MAINTENANCE—U. S. RIFLE, CAL. .30, M1



*Figure 12 — Rifle M1 with Piston and Operating Rod Partly Retracted,
Bolt Withdrawing Last Empty Cartridge Case from Chamber — Sectional View*

OPERATION AND FUNCTIONING

clip ejector. With the operating rod held to the rear by the operating rod catch, and the receiver empty, another loaded clip may be inserted without delay and firing resumed.

16. TO UNLOAD RIFLE.

a. To unload a cartridge from the chamber, pull and hold the operating rod in the extreme rear position, thus extracting and ejecting the round.

b. To remove the loaded clip from the receiver, hold the rifle with the right hand, thumb on operating rod handle, fingers around the trigger guard. Place the fingers of the left hand over the receiver and press in on the clip latch with the left thumb. The clip will then be ejected upward from the receiver and into the left hand.

CAUTION: Do not allow the bolt to move forward during the operation as it will push the top cartridge forward and prevent normal ejection of the clip.

c. To close the bolt on an empty chamber and retain a partially loaded clip in the receiver, press down on the top cartridge in the clip and allow the bolt to slide forward, making sure that the bolt is fully closed.

17. OPERATION OF RIFLE AS SINGLE LOADER.

a. With the receiver empty, pull the operating rod to the rear until it is caught by the operating rod catch. Place one round in the chamber. With the right side of the right hand against the operating rod handle and the fingers extended and joined, force the operating rod handle slightly to the rear, depress the follower with the right thumb, and permit the bolt to ride forward about 1 inch over the follower. Then remove the thumb from the follower and release the operating rod handle allowing the bolt to close.

NOTE: Should the gas actuation of the rifle be insufficient to cause proper functioning at any time, the rifle may be operated manually merely by pulling the operating rod handle to the rear after each cartridge is fired.

18. SAFETY PRECAUTIONS.

a. As long as any cartridges remain in the receiver, after a round has been fired, the rifle is ready to fire. The gun is safe only when it is "cleared;" in other words, the gun is never known to be safe when the bolt is closed.

ORDNANCE MAINTENANCE—U. S. RIFLE, CAL. .30, M1

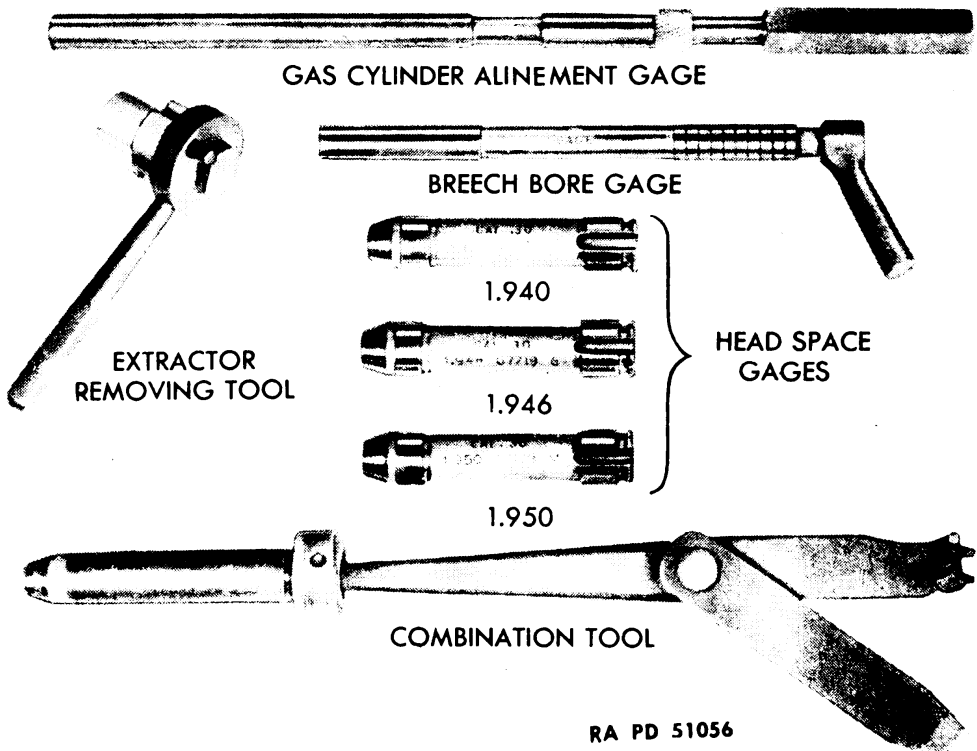
Section IV

TOOLS REQUIRED FOR INSPECTION PRIOR TO DISASSEMBLY

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Gas cylinder alinement gage	22
Head space gage	23
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Oiler and thong case with brush	25
Cleaning rod, jointed, cal. .30, M3	26
Cleaning brush, cal. .30, M2	27

19. TOOLS FOR INSPECTION (fig. 13).

a. General and special tools used in inspection are listed in Standard Nomenclature List No. B-20 (special repair tools), and are carried by the small arms repair truck. Description in general of the use of these tools is given in the following paragraphs. For detailed use refer to section V.



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Figure 13 — Special Tools Required for Inspection and Repairing

TOOLS REQUIRED FOR INSPECTION PRIOR TO DISASSEMBLY

20. EQUIPMENT FOR TRIGGER PULL TESTS.

- a. This equipment may be made up locally.

(1) The inspector should have three weights of $4\frac{1}{2}$, $5\frac{1}{2}$, and $7\frac{1}{2}$ pounds, respectively. Each of the weights should be provided with a wire so that trigger pressure will be applied $\frac{1}{4}$ inch from the lower end of the trigger. The wire should be long enough so that the pressure will be exerted parallel to the axis of the bore. Also it should be stiff enough to retain an L-hook bend not less than $2\frac{1}{4}$ inches long in the free end to allow the weight to swing clear of the butt of the rifle when testing.

21. BORE GAGE.

a. A breech bore gage is used to determine wear of the bore at the origin of the rifling. It is a cylindrical gage of conventional type having 10 graduations, each of which corresponds to 0.001 inch of wear. The 10th graduation or point marked "REJECT" is equivalent to a bore diameter of 0.310 inch, since the zero graduation is 0.300 inch. The bore gage is equipped with a handle for convenience in inserting it into the barrel at the chamber end. Use of this gage is described in section V.

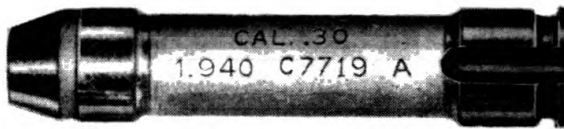
22. GAS CYLINDER ALINEMENT GAGE.

a. The gas cylinder plug alinement gage is used for rifles having the screw-on type gas cylinder. It checks the alinement of the gas cylinder plug which must be concentric with the bore of the rifle. It consists of a rod finished to the diameter of the bore with a slide of slightly larger diameter which can be pushed downward into the plug to check its concentricity. Use of this tool in checking alinement is described in section V.

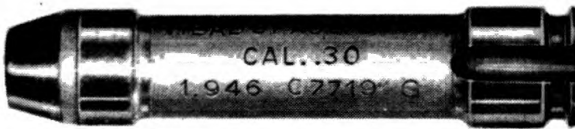
23. HEAD SPACE GAGE (fig. 14).

a. The head space gages are in the shape of cartridge cases. They are used to check the distance between chamber and the face of the bolt. The gages are used in conjunction with the bolt in the assembled rifle. Head space gages are of three sizes; 1.940 inches, 1.946 inches, and 1.950 inches in length. Only head space gages having beveled heads will be used in the inspection of the Rifle, cal. .30, M1. The head space gages have been revised to provide a 45 degree bevel of the heads. The gages are provided with a clearance cut for the ejector. The clearance cut eliminates the need of disassembling the rifle to check the head space. If other gages not having the clearance cut are used, the

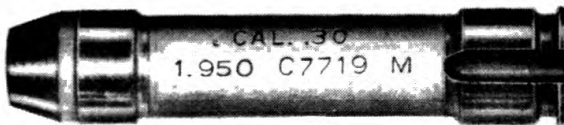
ORDNANCE MAINTENANCE—U. S. RIFLE, CAL. .30, M1



HEADSPACE GAGE C7719A
DIMENSION—1.940 INCHES



HEADSPACE GAGE C7719G
DIMENSION—1.946 INCHES



HEADSPACE GAGE C7719M
DIMENSION—1.950 INCHES

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Figure 14 — Head Space Gages and Field Test Bolt

TOOLS REQUIRED FOR INSPECTION PRIOR TO DISASSEMBLY

rifle must be disassembled and the ejector removed before head space check is made. Use of the head space gage is described in section V.

24. FIELD TEST BOLT (fig. 14).

a. The field test bolt is used in conjunction with the head space gages to determine whether the chamber, bolt, or bolt lug seats in the receiver are worn. Use of the field test bolt is described in section V.

25. OILER AND THONG CASE WITH BRUSH.

a. The oiler and thong case is a cylindrical tube threaded at both ends to take the caps. One end of the case holds the lubricating oil. The threaded cap for this end has a rod which is used as a dropper. The other end of the case holds the brush and thong which is used for cleaning the bore of the rifle when the Cleaning Rod M3 and Cleaning Brush M2 are not available. The case with contents are carried in one of the wells in the butt of the rifle.

26. CLEANING ROD, JOINTED, CAL. .30, M3.

a. The cleaning rod consists of two sections threaded together. Attached to the end of one section is a swivel handle to facilitate use of the rod. The end opposite the handle is slotted for assembly of the cleaning patch and has a threaded hole to accommodate the Cleaning Brush M2.

27. CLEANING BRUSH, CAL. .30, M2.

a. The Cleaning Brush M2 is of brass wire. The core is fastened to a threaded shank by which the brush is attached to the threaded end of the rod.

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Section V

INSPECTION PRIOR TO DISASSEMBLY

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28. GENERAL.

a. Inspection of the rifle prior to disassembly consists of visual and functioning inspections. They are made to determine the condition of the rifle and to indicate whether repair or adjustments are required. Checks are made on trigger pull, rear sight, front sight, gas cylinder, trigger housing group, hammer group, stock group, bolt group, the clip latch, and the barrel group. Dummy cartridges are used to determine whether the rifle is functioning properly.

b. The inspections should preferably be made in the order described in the following paragraphs.

29. PREINSPECTION.

a. The rifle should be thoroughly cleaned before inspection to remove any oil, fouling, or other foreign matter which might conceal defects. For instructions on cleaning the rifle refer to section X.

INSPECTION PRIOR TO DISASSEMBLY

30. GENERAL INSPECTION.

a. The rifle is first inspected as a unit for general appearance and condition, smoothness of operation, function of clip latch, clip ejector, follower, cartridge extractor and ejector.

31. OPERATING TEST.

a. The clip containing 8 dummy cartridges is placed in the receiver in the normal manner and the bolt allowed to close. The operating rod handle is checked to make certain that the bolt is in the fully closed position. The bolt is then retracted slowly to note that the extractor has fully engaged the cartridge and that the ejector throws the cartridge from the receiver (fig. 15). The bolt is fully retracted and the operation repeated until the entire clip of eight cartridges has been fed through the successive cycle of operations. As the last cartridge is ejected, the empty clip should also be thrown firmly upward and away from the receiver. The operating rod handle and bolt then remain in the retracted position.

b. **Failure to Feed.** Failure to feed may be caused by failure of the bolt to go far enough to the rear to pick up a new round. If the bolt fails to go fully home, dirt in the locking recesses, an obstruction on the face of the bolt, a dirty chamber, or a ruptured cartridge case, part of which has remained in the chamber, may be the cause. Occasional failure to feed may be caused by a defective follower which does not hold the cartridge firmly in line. When this occurs, the nose of the bullet will be to one side or the other of the entrance to the chamber. Also the cartridge may not be ejected but fed back into the chamber. This



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Figure 15 — Functional Inspection of Rifle with Dummy Cartridges

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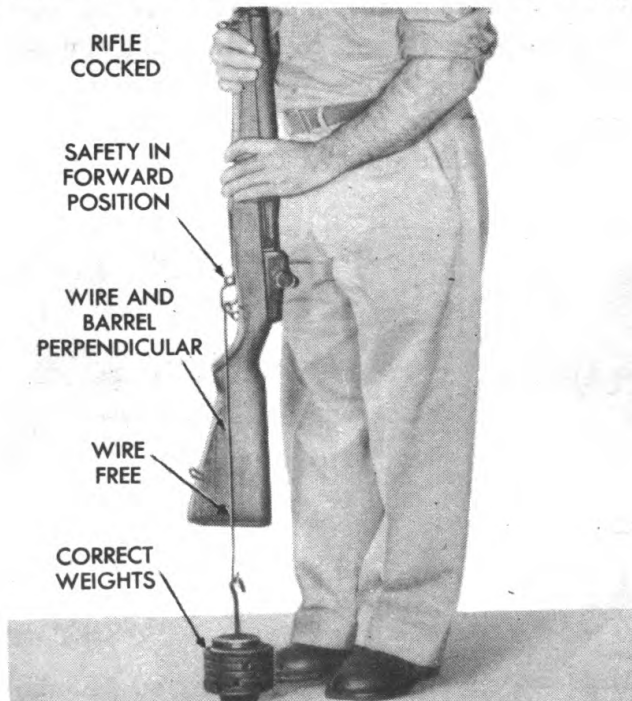
is caused by lack of lubrication or excessive friction of the moving parts or a faulty ejector. The conditions are remedied by replacing damaged parts, removing all carbon, and thoroughly lubricating all parts as prescribed in section X.

c. **Failure to Extract.** Failures to extract are generally caused by : extremely dirty chamber; improper assembly of the rifle, such as failure to replace the extractor plunger and spring; broken extractor. An extremely dirty chamber or a broken extractor will cause repeated failure to extract the dummy cartridges.

32. TRIGGER PULL.

a. The trigger, when pulled, should move to the rear without stopping or gritting. Trigger pull must be greater than 5 pounds, but should not exceed $7\frac{1}{2}$ pounds. Rifles cleaned and repaired in ordnance establishments should have a minimum trigger pull of not less than $5\frac{1}{2}$ pounds. This is to allow for wear.

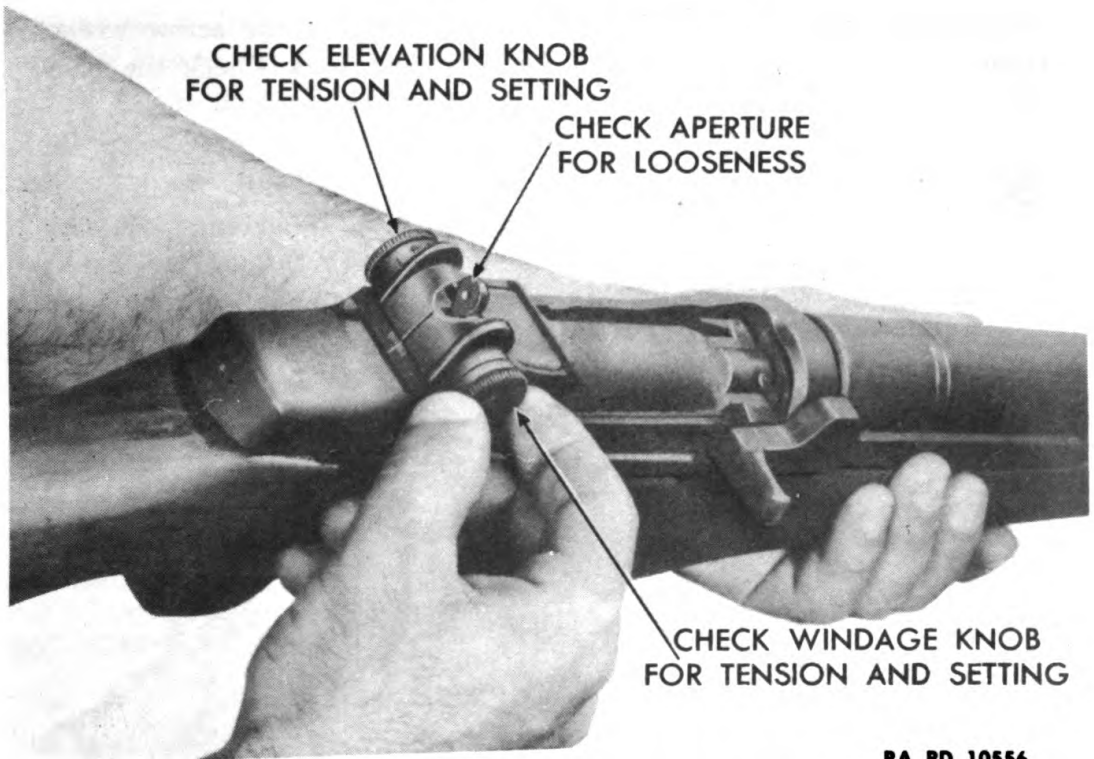
b. Trigger pull is determined with proper weights attached to a wire having a hook formed in the free end. Place the safety in the forward position and cock the rifle. Have the weight resting on the floor or ground and hook the trigger weight wire onto the trigger so that pressure will be applied about $\frac{1}{4}$ inch from the lower end of the trigger. Care should be taken to see that the wire contacts the trigger only and



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Figure 16 — Checking Trigger Pull with Weights

INSPECTION PRIOR TO DISASSEMBLY



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Figure 17 — Checking the Rear Sight, Showing Points to be Inspected

does not rub against the trigger guard or stock, and that the wire and the barrel are vertical and parallel, then, raise the weight from the floor as gently as possible (fig. 16). If the 4½-pound weight pulls the trigger (field test), or the 7½-pound weight fails to pull the trigger, the rifle should be corrected; however, the only correction allowed in the field is the selective assembly of the hammer or trigger assembly, or both.

33. REAR SIGHT.

a. Try the rear sight elevating and windage knobs for tension (fig. 17). To verify the setting of the rear sight, set the 100-yard elevating knob graduation opposite the index line on the receiver. With this setting, it should be possible to depress the aperture from one to nine clicks. Check the aperture from one to nine clicks. Make final setting on range. Check the aperture for looseness and burs. Check the aperture for seating relative to binding between the receiver and the forward end of the cover. Check the cover for tightness and tension relative to the aperture.

34. FRONT SIGHT (fig. 18).

a. Check the front sight for looseness, bent or burred wings, loose or burred screw (screw-on type gas cylinder), and missing screw seal

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and loose screw (spline type gas cylinder). Check the screw wrench recess (spline type gas cylinder) for wear and burs. Check the blade for "shine."



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Figure 18 — Checking the Front Sight, Showing Points to be Inspected

35. GAS CYLINDER GROUP (SCREW-ON TYPE).

a. Check the gas cylinder for looseness, dents, burs on bayonet lug, bent or burred front sight lugs, and damaged threads, bent or broken swivel, and loose or burred stacking swivel screw. Remove the gas cylinder plug screw and the plug and inspect the gas cylinder plug and the interior of the gas cylinder for an excessive accumulation of carbon. Check the outside of the gas cylinder for rust, where it contacts the barrel near the port. Inspect the bore of the gas cylinder plug for bullet marks; if present, it indicates that the bore of the plug is not concentric with the bore of the barrel. This condition may be caused by dirt or carbon deposits in the bottom of the groove into which the gas cylinder plug fits. If dirt and carbon are present, clear the groove, and check the alinement with the gas cylinder plug alinement gage.

b. **Gas Cylinder Alinement.** To check gas cylinder alinement, proceed as follows:

(1) Wipe the gas cylinder plug alinement gage clean and inspect it for smoothness and free sliding action of the sleeve. Remove any

INSPECTION PRIOR TO DISASSEMBLY

gumminess and apply a very light, uniform coat of oil on the spindle and the sleeve.

(2) Clean the bore of the barrel and the bore of the gas cylinder plug. Special care should be taken to remove all carbon which might reduce the effective bore diameter.

(3) Hold the sleeve of the gage back against the handle. Insert the gage body through the gas cylinder plug and into the barrel as far as it will go coming to a stop against the small tapered portion. This accurately centers the gage in the muzzle of the barrel.

(4) Move the sliding sleeve into the gas cylinder plug as far as it will go without touching the bore of the plug. If the alinement is satisfactory, the sleeve will slide in until the knurled head rests against the face of the gas cylinder plug without touching or binding in the bore of the plug. If the sleeve touches or binds at any point, the alinement is unsatisfactory and the gas cylinder plug should be replaced.

36. GAS CYLINDER GROUP (SPLINE TYPE).

a. Check the gas cylinder for looseness, dents, burs on the bayonet lug, and a bent or worn stacking swivel screw. Check the outside of the gas cylinder for rust where it contacts the barrel near the gas port. Check the front sight dovetail for burs, and the gas cylinder lock and screw for damaged thread, burs, and damage to the slot in which the combination tool fits.

37. TRIGGER HOUSING GROUP.

a. Check the trigger guard for deformation and the latch for retention, wear, and burs. The trigger guard should latch and unlatch without using undue force. Test the tension of the clip ejector. Test the function and free action of the trigger.

38. BOLT GROUP.

a. Test the bolt for freedom and smoothness of movement and for locking.

39. CLIP LATCH.

a. Check the clip latch for freedom of movement and tension of the spring.

40. RECEIVER.

a. With the action open, inspect the receiver for wear in the ways, contacting surfaces, and for burs. Check the rear sight wings for deformation, burs, and worn serrations.

ORDNANCE MAINTENANCE—U. S. RIFLE, CAL. .30, M1**41. BARREL.**

a. The barrel is visually inspected by placing the barrel reflector in the chamber and examining the bore from the muzzle to the breech. In the absence of a barrel reflector, use a piece of white paper to provide a reflecting surface.

b. If the barrel is not bent or otherwise deformed, and the bore appears free from bulges and pits, and the lands are sharp and uniformly distinct, it is serviceable.

c. If the bore contains small pits, but has sharp and uniformly distinct lands, and is free from bulges and not otherwise deformed, it is serviceable.

d. If the barrel contains a bulge, it is not serviceable and should be scrapped. This condition is indicated by a shadowy depression or dark ring in the bore. It may often be noticed through a bulge or raised ring on the barrel's exterior surface after the rifle has been disassembled.

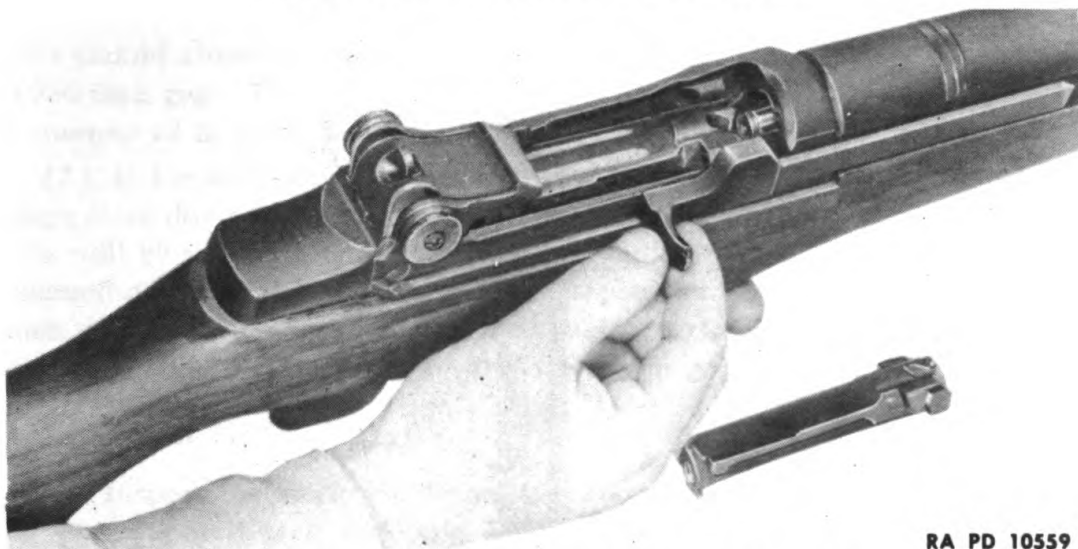
e. If the barrel is pitted to the extent that the sharpness of the lands is affected, or if it has a pit or pits in the lands or grooves large enough to permit the passage of gas past the bullet, it should be scrapped. A pit the width of a land or groove and $\frac{3}{8}$ to $\frac{1}{2}$ inch long or longer indicates this condition. This condition indicates that proper care of the barrel has not been taken.



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Figure 19 — Checking with Breech Bore Gage

INSPECTION PRIOR TO DISASSEMBLY



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Figure 20 — Checking with Field Test Bolt and Head Space Gage

f. If the bore at the muzzle appears to be enlarged, improper cleaning is indicated.

g. Barrels considered unserviceable by visual inspection due to wear at the origin of the rifling, and barrels found serviceable by visual inspection will be bore gaged. With the bolt retracted, insert the gage into the chamber without undue force (fig. 19). Note the gage graduation that aligns with the rear face of the barrel. If the gage reads 0.310 inch or more the barrel is unserviceable, and it is unnecessary to check for pits in the barrel or other defects.

h. The head space should be tested with the 1.950-inch head space gage. Place the 1.950-inch head space gage on the face of the bolt and under the extractor so that the ejector enters the clearance cut in the head of the gage (figs. 14 and 20). If the bolt will not close on the gage, the head space is satisfactory. The true head space can be ascertained only when closing the bolt on a head space gage by rotation of the right-hand bolt lug with the finger. If the bolt closes or nearly closes on the gage, proceed as follows:

(1) Remove the operating rod and related parts, disassemble the bolt, and replace it in its ways in the receiver. (See section VI for proper disassembly procedure.)

(2) Try to close the rifle bolt on the 1.950-inch head space gage. If this bolt closes freely, try the field test bolt (fig. 20). If the rifle bolt closes freely on the head space gage and the field test bolt does not, excessive head space due to a worn bolt is indicated. In this case, the worn bolt should be replaced by a serviceable bolt which should be tested using both the 1.940-inch gage and the 1.950-inch gage. This

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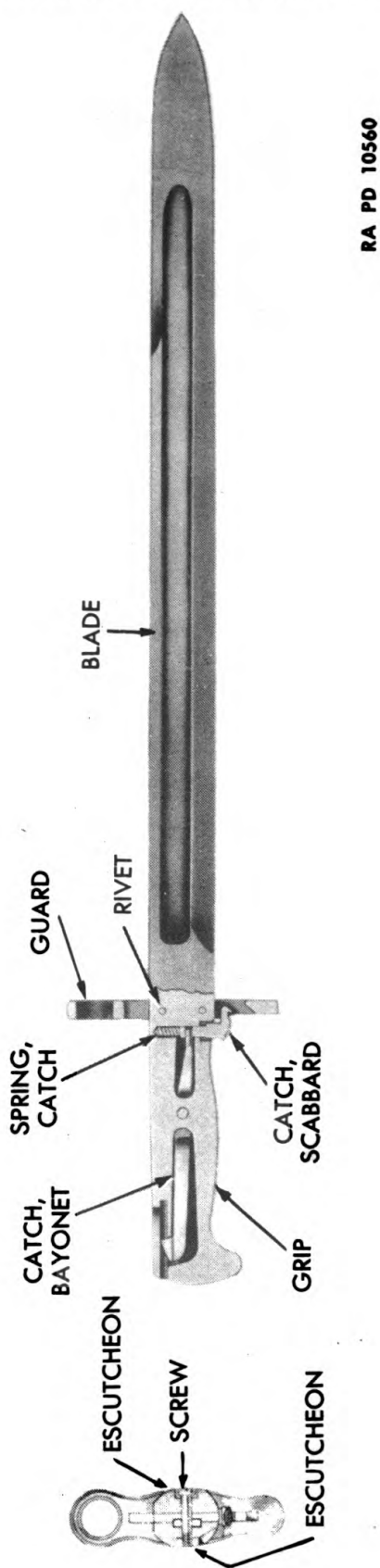


Figure 21 — Bayonet M1905 — Sectional View

INSPECTION PRIOR TO DISASSEMBLY

bolt should close on the 1.940-inch gage and should not close on the 1.950-inch gage. The worn bolt must be immediately mutilated in such a manner as to preclude its further use in the rifle.

(3) If the field test bolt closes freely on the 1.950-inch head space gage, it is due to worn locking lugs on the receiver. In this case, the rifle will be withdrawn from service for overhaul. When rifles are being cleaned and repaired at the arsenal or depot, the 1.946-inch and 1.940-inch gages will be used. The bolt should not close on the 1.946-inch gage and should close freely on the 1.940-inch gage.

42. STOCK GROUP.

a. Inspect the stock for dryness of wood, cracks, scratches, bruises, or mutilations. Check for loose or bent sling swivels, and burs, or a loose front swivel screw. Check for a loose or burred stock ferrule. Check the seating of the butt plate and for a loose or missing short butt plate screw. Check the butt plate cap for function, looseness on the pin, loose pin, and wear in the hinge. Check the tension of the butt plate plunger spring. Clean the butt plate plunger of foreign matter. Check to see if the combination tool, oiler, thong case, and container of rifle grease are in the butt well.

b. Inspect the hand guards for cracks, scoring, and burs. Check the ferrule and rear hand guard band for looseness and burs. Check the lower band for looseness, burs, and loose or missing pin. The pin should be staked. Check the spacer on the front hand guard for position and looseness.

43. BAYONET M1905.

a. Inspect the bayonet as a unit for appearance and general condition, fit and retention on rifle, and looseness of components.

b. Inspect the blade for deformation, broken or nicked point, nicked or burred blade edge, dullness, and burs. Check the lug ways in the handle for wear, dents, burs, and foreign matter. Check the scabbard catch for foreign matter.

c. Check the guard for deformation, deformed or dented barrel band, loose fit on the barrel, looseness on the blade, loose rivets, and burs. Check the bayonet scabbard catch slot for deformation and burs.

d. Check the bayonet catch for function, wear of the hook, free action in the slot, deformation, looseness on the grip screw, wear in the screw hole, and for burs.

e. Check the scabbard catch for function, free action in the well, worn or burred hook, worn checkering, looseness in the bayonet catch

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slot, and for burs. Test the spring tension. (Free length catch spring 0.475 inch-0.030.)

f. Check the grips for cracks, dents, scoring, and protrusion over the blade handle. Check the grip screw and escutcheons for looseness, wear, projection above grips, and for burs.

44. BAYONET SCABBARD M3.

a. Inspect the scabbard as a unit for appearance, general condition, fit and retention of the bayonet, ease of bayonet withdrawal, and looseness of components.

b. Check the body for cuts, deep abrasions, or splitting.

c. Check the mouthpiece top for looseness in the body and for wear or burs.

d. Check the hook for deformation, wear, and burs.

45. BAYONET SCABBARD M1910.

a. Inspect the scabbard as a unit for appearance, general condition, fit and retention on the bayonet, ease of bayonet withdrawal, and looseness of components.

b. Check the body cover for condition, cuts, or deep abrasions. Check the reinforced leather tip for looseness (ripped stitches) on the body cover, cuts or abrasions, and for condition of the leather. Check the drain eyelet for security in body and for stoppage and burred flange.

c. Check the mouthpiece top for looseness in the body; check the catch lugs for wear, burs, and deformation and retention with the scabbard catch on the bayonet. Check the bushing for looseness in the top, deformation, wear, and burs.

d. Check the hanger for tightness, loose rivet and wear or cracking in the loop. Check the hook for deformation, wear, and burs.

46. GUN SLING.

a. Inspect the sling as a unit for appearance, general condition, flexibility, and function of hooks and sliding loops.

b. Check the straps for condition of leather, weakness, ripped stitches, cuts and abrasions. Check the hook holes for wear and breaks between holes. Check for tears at the rivets, and wear and cracking at the loops. The leather straps should not crack when bent at a sharp angle.

c. Check the hooks for deformation, pinching, and burs. Check the rivets for looseness. Check the loops for deformation and burs. Check the sliding loops for looseness on the straps, for pinching, and burs.

Section VI

DISASSEMBLY

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Disassembly of trigger group	56
Disassembly of stock group	57

47. GENERAL.

a. In this section, the step-by-step disassembly procedure is given. This covers disassembly into subassemblies, then disassembly of each subassembly. Attention should be paid to the position and method of disassembling the various groups. This will aid in reassembling.

b. Disassembled groups and parts should be placed upon a clean flat surface, preferably of wood, to avoid abrasion of parts, and care should be taken to avoid loss of pins, springs, and other small parts.

c. Disassembly, assembly, and repairs, as described in this and following sections are to be undertaken only by ordnance personnel to whom such work has been properly delegated.

d. The barrel and receiver group, trigger group, and the stock group each may be disassembled independently. It is also possible to remove the gas cylinder, the clip latch, and the front and rear sights from the barrel and receiver group without other disassembling. Furthermore, by the use of the extractor removing tool, the bolt may be disassembled without otherwise disassembling the barrel and receiver group. Also the bolt may be removed with the trigger housing in position, but the hammer must be cocked.

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48. DISASSEMBLY OF MAJOR GROUPS.

a. Step-by-step disassembly procedure for the Rifle M1 is as follows:

(1) Make certain that no cartridges remain either in the clip or in the chamber.

(2) Turn the rifle upside down, preferably on a wood bench or other clean surface. Grasp the rear end of the trigger guard and pull backward and upward on the guard. This disengages the lugs which retain the trigger group in the receiver. Withdraw the trigger group by pulling directly upward.

(3) Now lift the stock group from the receiver by pulling upward on the butt end of the stock. At this point, the rifle is disassembled into three major subassemblies; namely, the barrel and receiver group including the gas cylinder group, the trigger housing group, and the stock group (fig. 22).

49. DISASSEMBLY OF BARREL AND RECEIVER GROUP (fig. 23 and 24).

a. In disassembling the barrel and receiver group, proceed as follows:

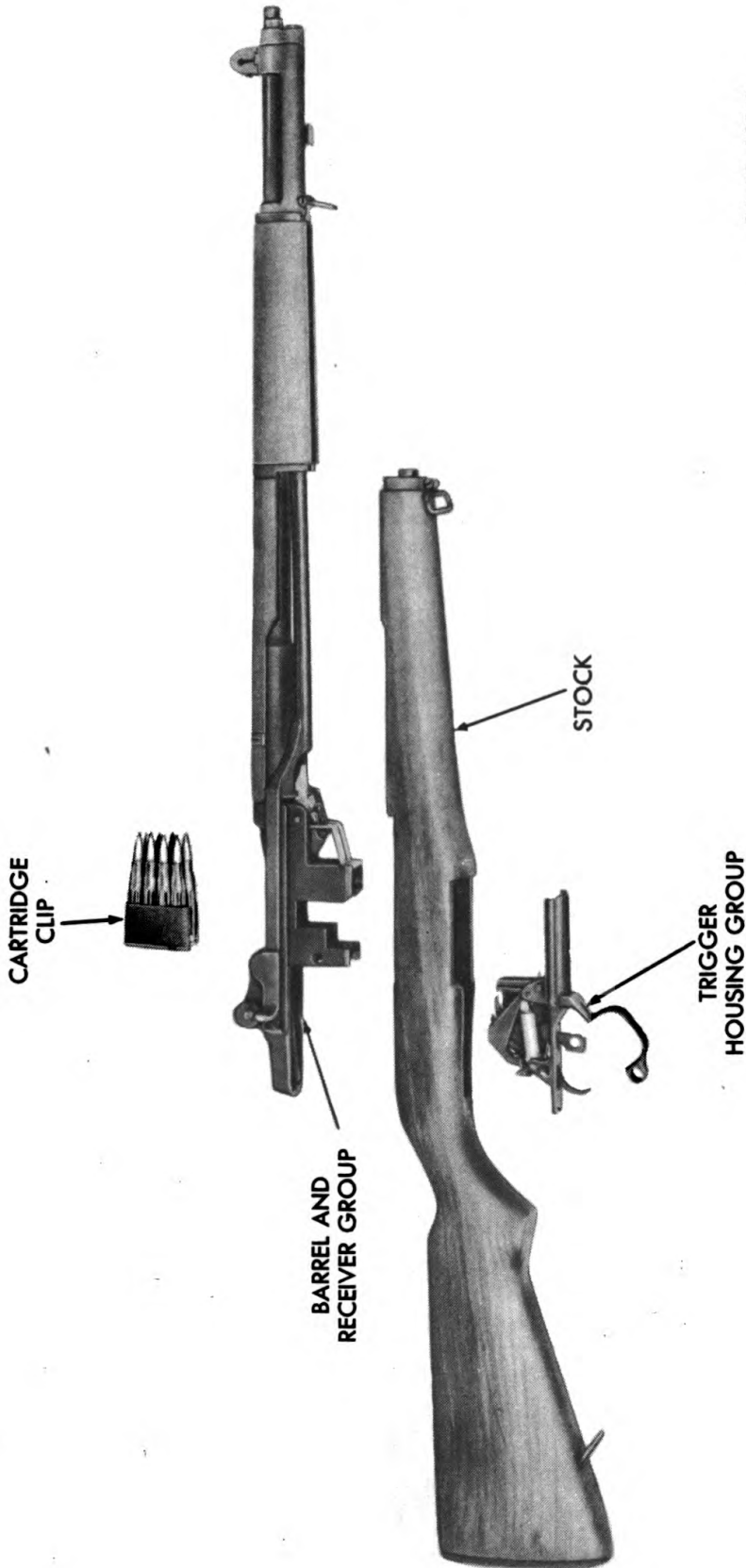
(1) Push forward on the rear end of the follower rod and unhook it from the follower arm; then withdraw the follower rod with its spring from the operating rod. Remove the operating rod spring from the follower rod. (Remove the compensating spring, if present, from the follower rod by grasping the spring and twisting the follower rod, exerting a slight pull at the same time.)

(2) Using the drift of the combination tool, push out the follower arm pin from right to left (barrel and receiver group still in inverted position) and remove the follower arm, accelerator and operating rod catch assembly, and bullet guide. Do not disassemble the accelerator from the operating rod catch (figs. 24 and 25).

(3) Lift the follower assembly upward and out of its slots in the receiver.

(4) Pull the operating rod back to approximately $\frac{1}{2}$ inch from its rearmost position. This brings the lug inside of the operating rod handle to a position where it coincides with a notch in the slide of the receiver. Now pull outward and upward on the operating rod handle until it is disengaged from the receiver and bolt (fig. 26). The operating rod may now be removed by twisting it slightly and pulling it toward the rear out of the gas cylinder. (The operating rod is intentionally bent. Do not attempt to straighten it.)

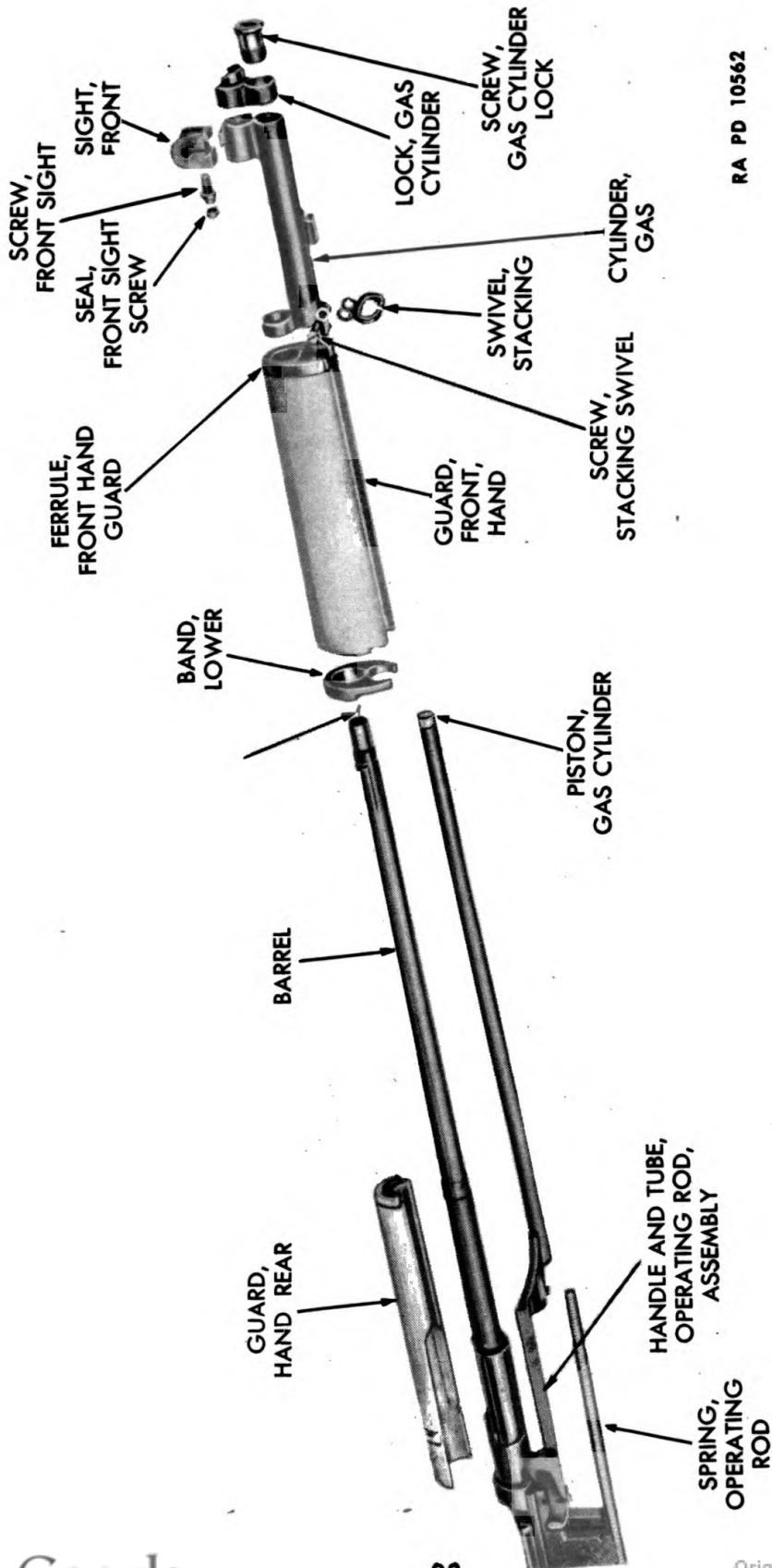
DISASSEMBLY



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Figure 22 — Barrel and Receiver Group, Trigger Housing Group, Stock, and Loaded Cartridge Clip

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RA PD 10562

Figure 23 — Gas Cylinder Group (Spline Type), with Hand Guards, Barrel and Operating Rod Assembly — Exploded View

DISASSEMBLY

RA PD 51058

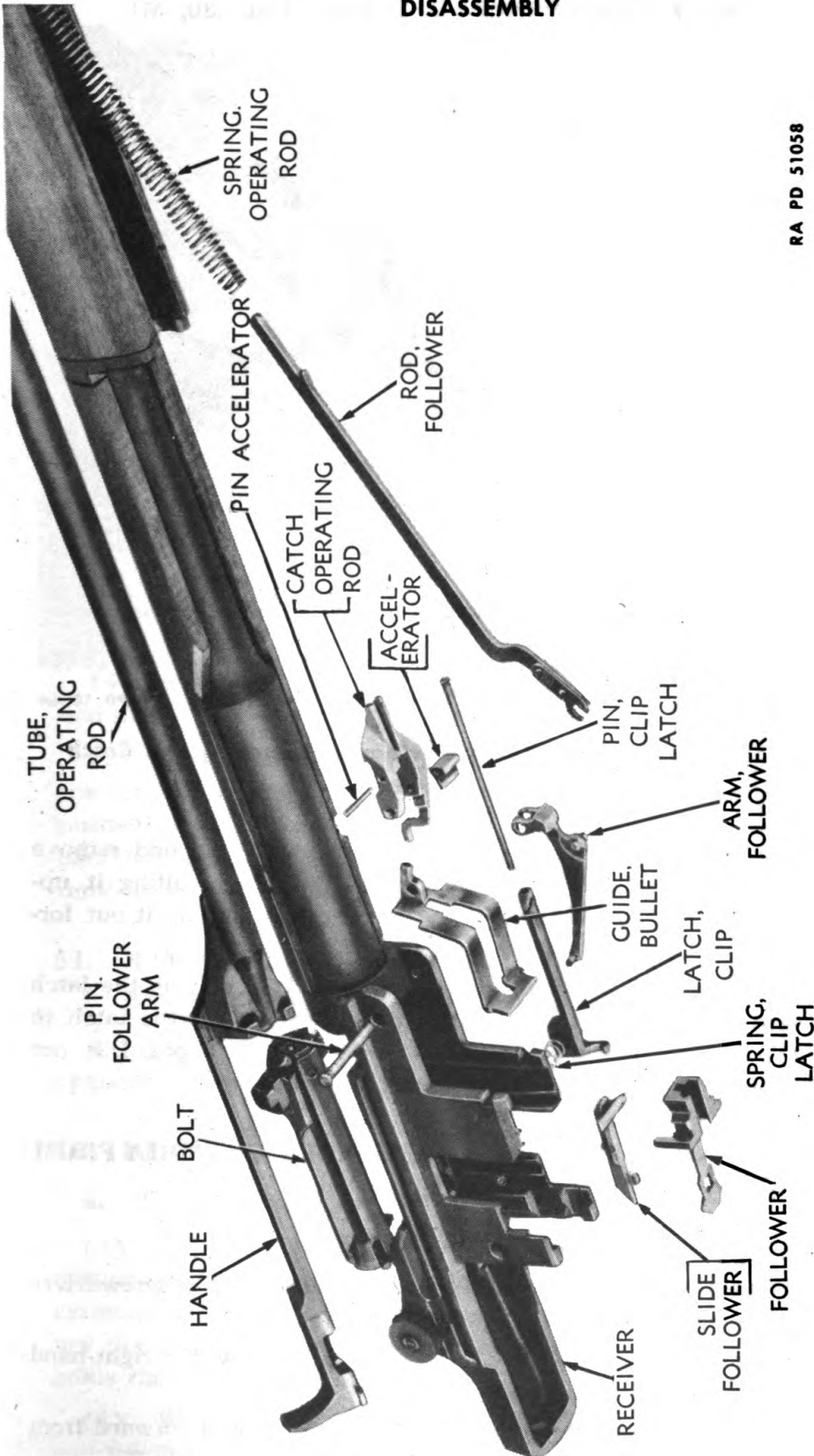


Figure 24 — Receiver Group — Exploded View

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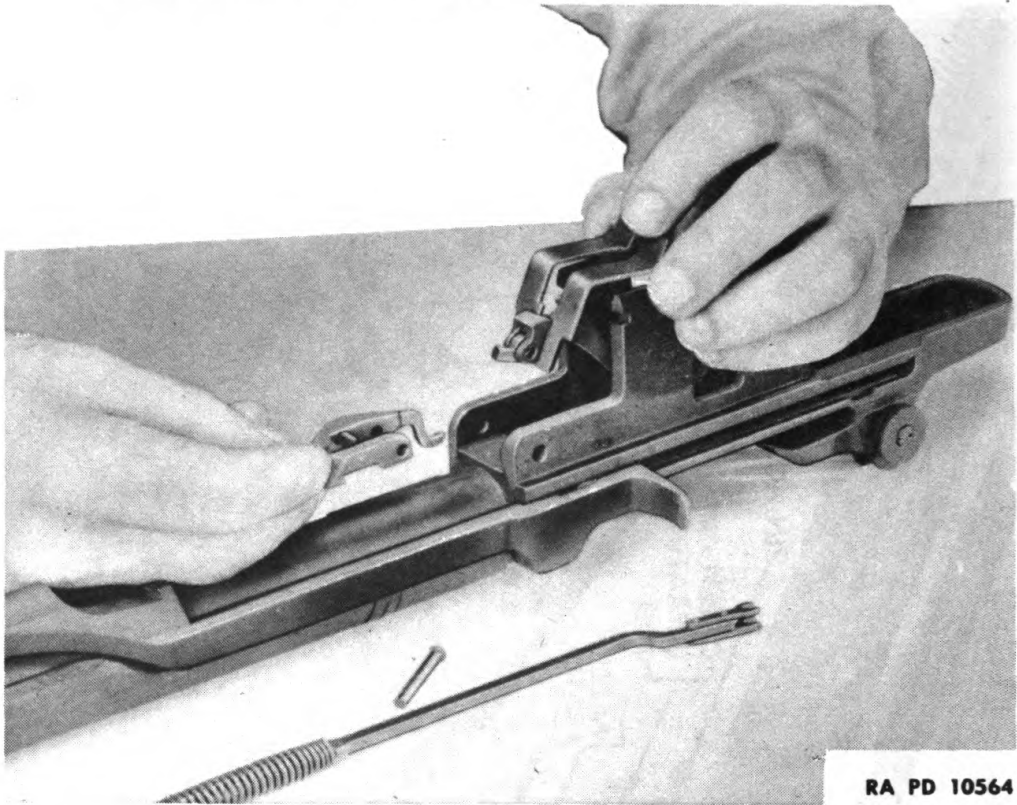


Figure 25 — Disassembling Bullet Guide and Operating Rod Catch from Receiver

(5) Turn the barrel and receiver group right side up and remove the bolt by pulling it forward approximately one inch, tilting it upward at an angle of approximately 15 degrees, then sliding it out forward from the receiver.

(6) The clip latch and its spring are removed by driving the latch pin forward out of the receiver with a drift. Press in on the latch to relieve the tension of the spring while driving out the pin. Lift out clip latch with clip latch spring attached.

50. REMOVING SPLINE TYPE GAS CYLINDER ASSEMBLY FROM BARREL AND RECEIVER GROUP.

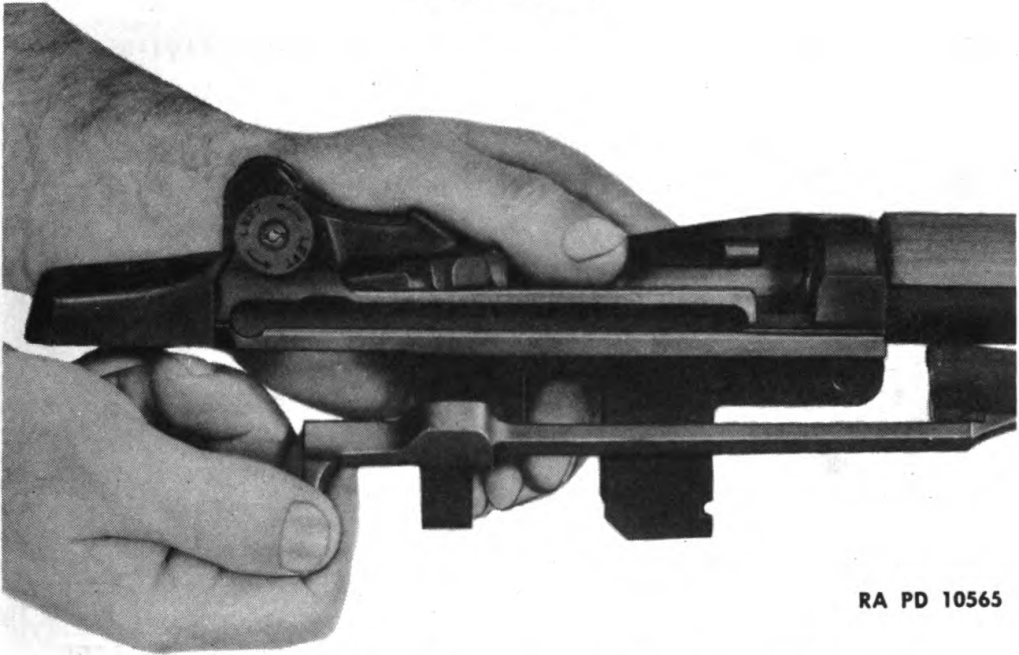
a. In disassembling, proceed as follows:

(1) With the screwdriver end of the combination tool, or screwdriver of similar size, unscrew the gas cylinder lock screw.

(2) Unscrew the gas cylinder lock, which is fitted with a right-hand thread on the end of the barrel.

(3) Remove the gas cylinder by pushing or driving it forward from the barrel (fig. 27).

DISASSEMBLY



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Figure 26 – Disassembling Operating Rod from Receiver Slide

(4) Remove the front hand guard by sliding it forward off the front end of the barrel.

(5) Drive out the pin holding the lower band to the barrel, and slide the lower band forward off the barrel. The rear hand guard is then pushed forward about one inch so that the lip on the right side of the band will disengage the slot on the barrel. The rear hand guard is then removed by twisting it slightly and lifting it from the barrel.

51. REMOVING SCREW-ON TYPE GAS CYLINDER ASSEMBLY FROM BARREL AND RECEIVER GROUP.

a. Remove front sight screw and lift out front sight. Unscrew gas cylinder assembly from barrel.

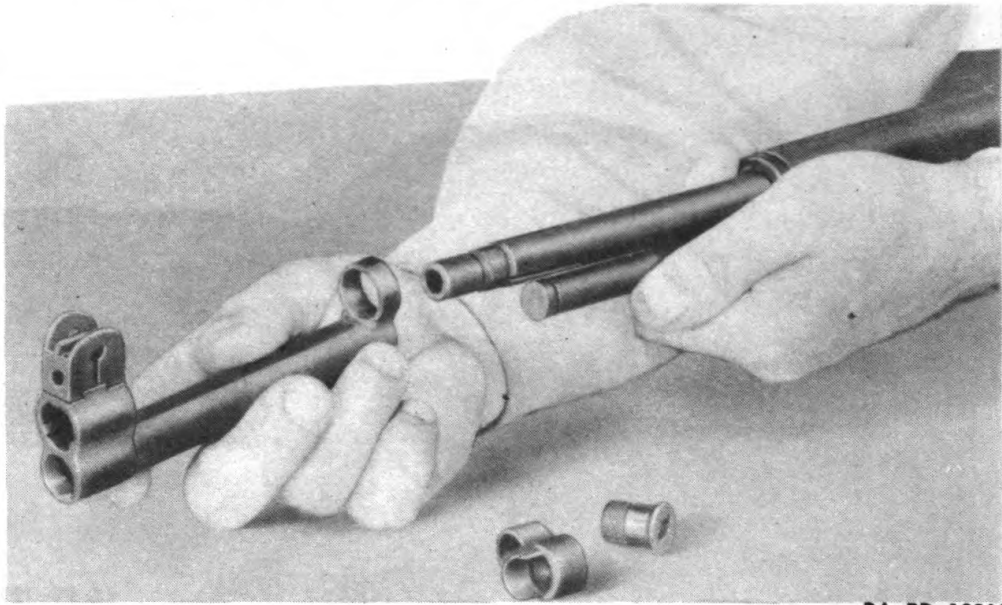
52. DISASSEMBLY OF BOLT (fig. 28).

a. To disassemble the bolt, proceed as follows:

(1) Place the thumb over the face of the bolt to prevent the ejector, ejector spring, extractor spring and its plunger from flying out when the extractor is released. With screwdriver blade of the combination tool pry the extractor from its seat in the bolt. The spindle of the extractor holds the various components of the bolt group into the bolt.

(2) Withdraw the ejector and spring, extractor spring and plunger, and the firing pin from the bolt.

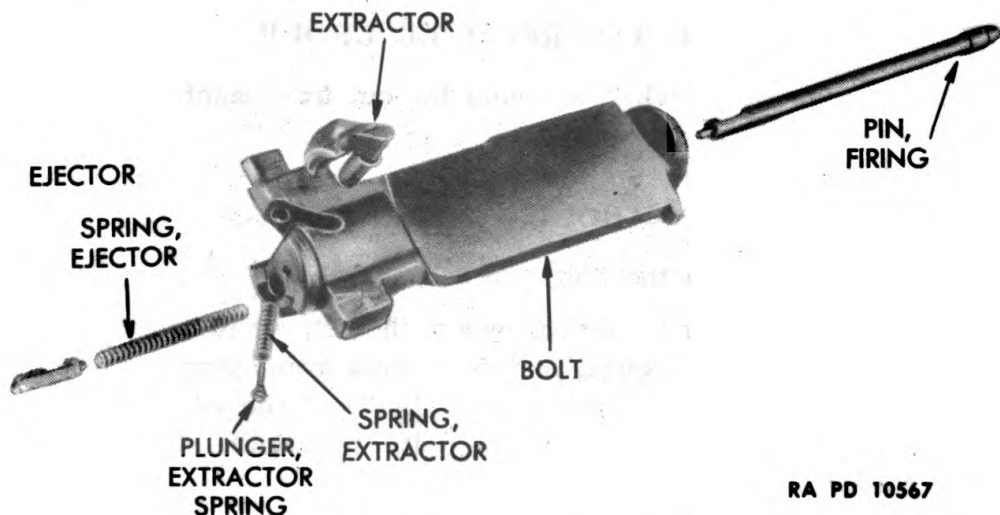
ORDNANCE MAINTENANCE—U. S. RIFLE, CAL. .30, M1



RA PD 10566

Figure 27 — Disassembling Gas Cylinder Group (Spline Type)**53. REMOVAL OF A BROKEN FIRING PIN.**

a. If the operating rod handle cannot be moved to the rear by a sharp blow with the heel of the hand, the firing pin may be broken, and having come out of its seat in the bolt, may have become wedged between the rear of the bolt and the top of the receiver. Attempt to remove the barrel and receiver group from the stock and the firing pin may fall out. If the barrel and receiver group or trigger housing cannot be removed easily, do not force them. Turn them upside down, shake, and work the parts carefully until they will come apart.



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Figure 28 — Bolt Assembly — Exploded View

DISASSEMBLY

54. REMOVING BOLT WITHOUT OTHERWISE DISASSEMBLING RIFLE.

a. The bolt may be removed by unhooking the operating rod from it as described in paragraph 49; then depress the follower while withdrawing the bolt. Care must be exercised when the rod is released to prevent bending it. *Removal of the bolt in the above manner is recommended only where limited time is available in restoring the weapon to firing condition.*

55. DISASSEMBLY OF REAR SIGHT FROM BARREL AND RECEIVER GROUP.

a. To disassemble the rear sight from the barrel and receiver group, proceed as follows:

(1) Lower the aperture as far as it will go, noting the reading on the elevating knob. Record it for use in assembling.

(2) Using the combination tool, unscrew the rear sight nut from the right side of the rear sight (fig. 29). Unscrew the windage knob, taking care that the rear sight nut lock assembly, which is inside the windage knob, does not become lost. Remove the nut lock and nut lock spring from the windage knob.

(3) With a screwdriver, remove the rear sight elevating knob screw from the left side of the rear sight. Remove the rear sight elevating knob. Pull out the rear sight elevating pinion from the left side of the receiver. Grasp the aperture and pull it upward about $\frac{1}{2}$ inch. Then place the thumb under the top of the aperture and push forward to remove the rear sight cover, rear sight base, and aperture.

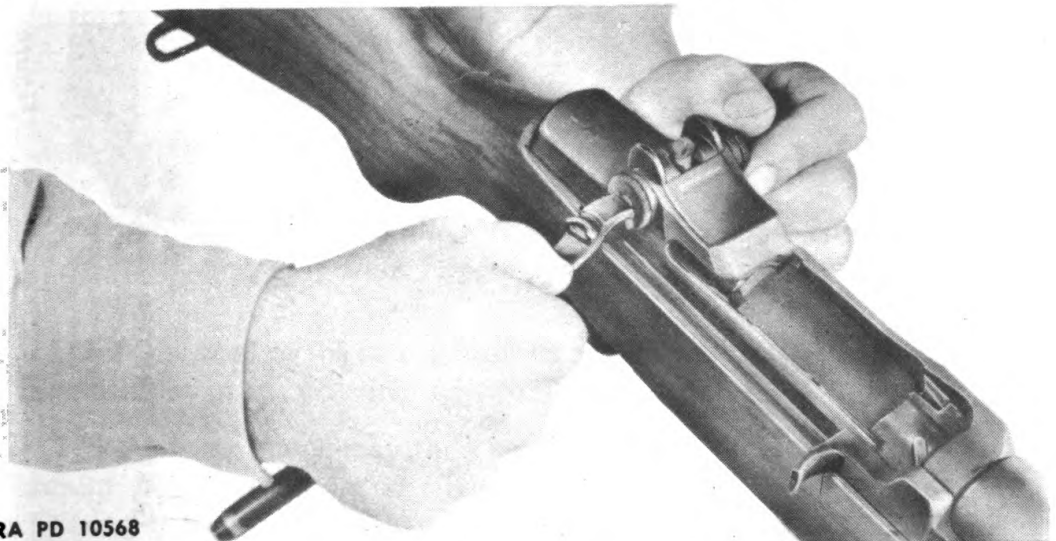


Figure 29 — Disassembling Rear Sight Assembly with Combination Tool

ORDNANCE MAINTENANCE - U. S. RIFLE, CAL. .30, M1

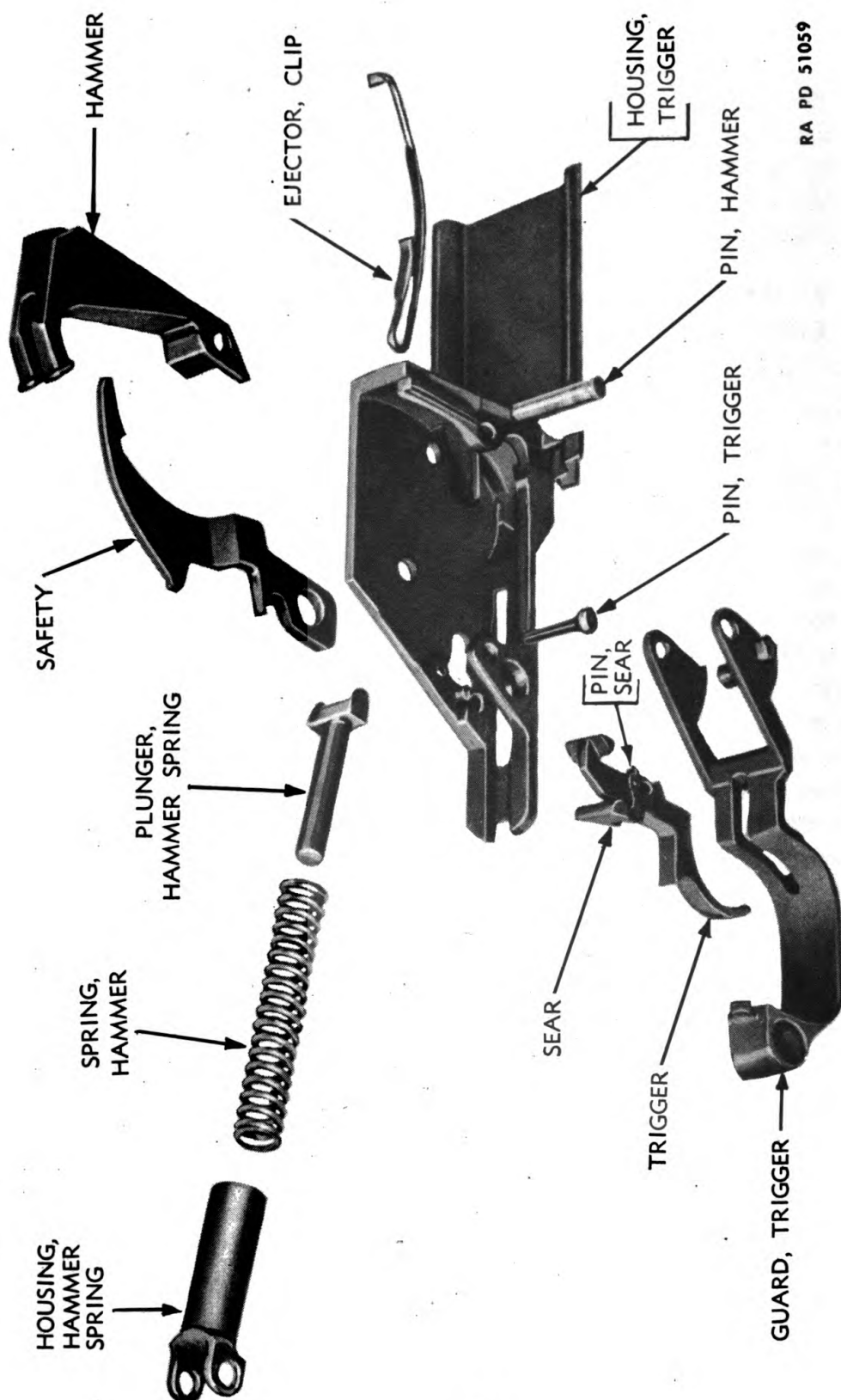
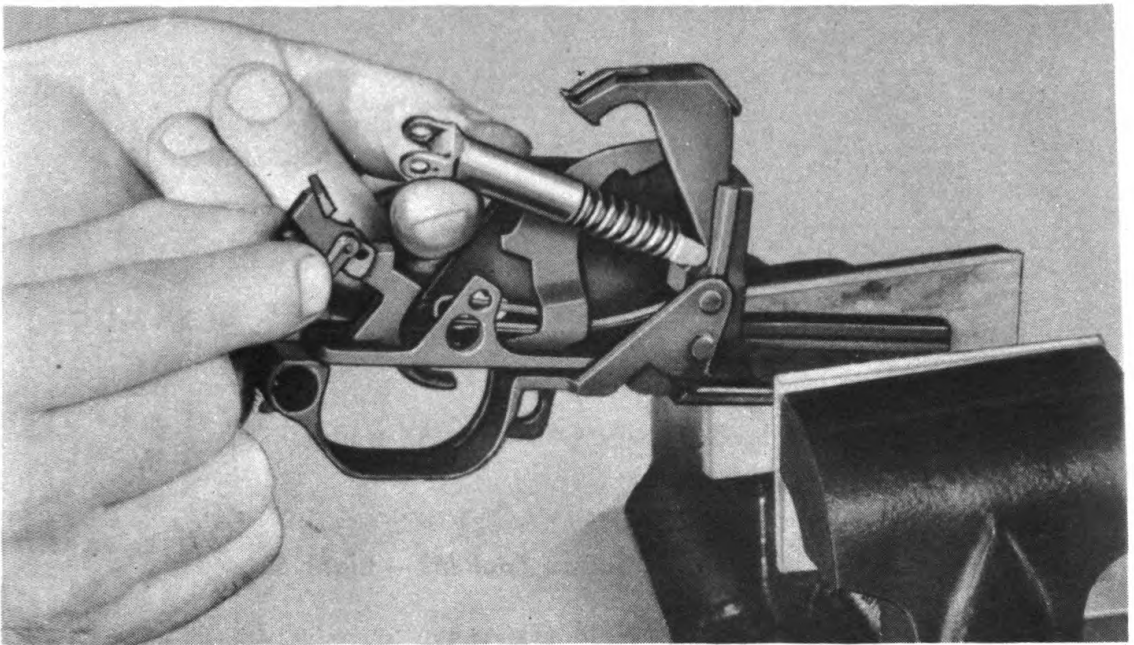


Figure 30 – Trigger Housing Group – Exploded View

DISASSEMBLY

56. DISASSEMBLY OF TRIGGER GROUP (fig. 30).

a. The trigger housing group being removed, close and latch trigger guard. Release hammer to the fired position. Hold group in right hand with right thumb on sear, forefinger pulling back on trigger base of trigger housing braced against a firm support, and press on sear with right thumb to relieve tension on trigger pin. Start trigger pin from its seat with a drift held in left hand; then remove it. Release pressure of right thumb and forefinger gradually, permitting hammer spring to extend to its full length, at the same time steadying hammer spring housing with fingers of left hand. Remove trigger assembly (fig. 31) (do not remove sear pin or sear). Remove hammer spring housing, hammer spring, and hammer spring plunger, and separate these parts. Push out hammer pin from left side and remove hammer. Remove safety by pressing its top away from left side of trigger housing until stud snaps out of its seat, and lift it from its slot in trigger housing.



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Figure 31 — Disassembling Trigger and Hammer Spring from Trigger Housing

b. Lift the stud of the safety from its hole in the housing and remove it from its slot in the housing.

c. The trigger guard may then be removed by sliding it back to the dismount notch, revolving it slightly in a counterclockwise direction, and lifting it from the housing. The clip ejector may then be removed by inserting the point of the combination tool in the dismounting hole

ORDNANCE MAINTENANCE—U. S. RIFLE, CAL. .30, M1

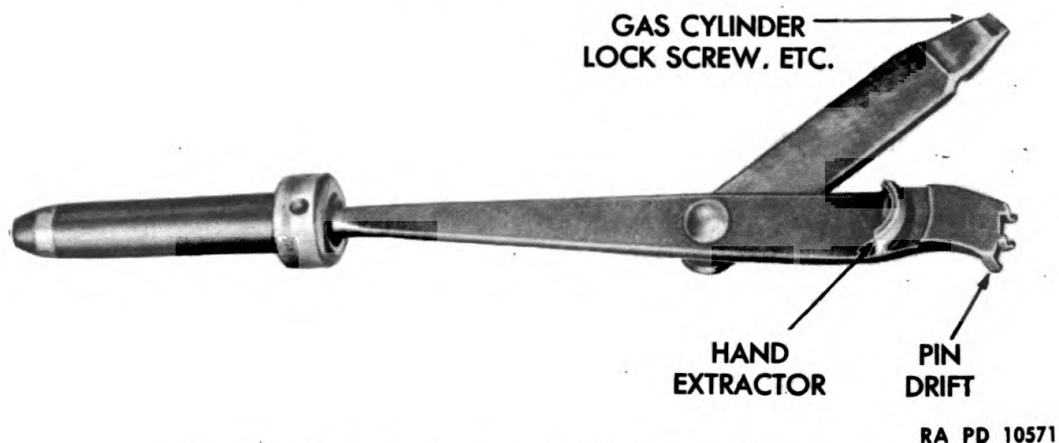


Figure 32 — Combination Tool M3 — Left Side

in the housing and pushing it out from under the retaining lug on the housing. Hold the finger over the clip ejector to prevent its flying out of the housing when released.

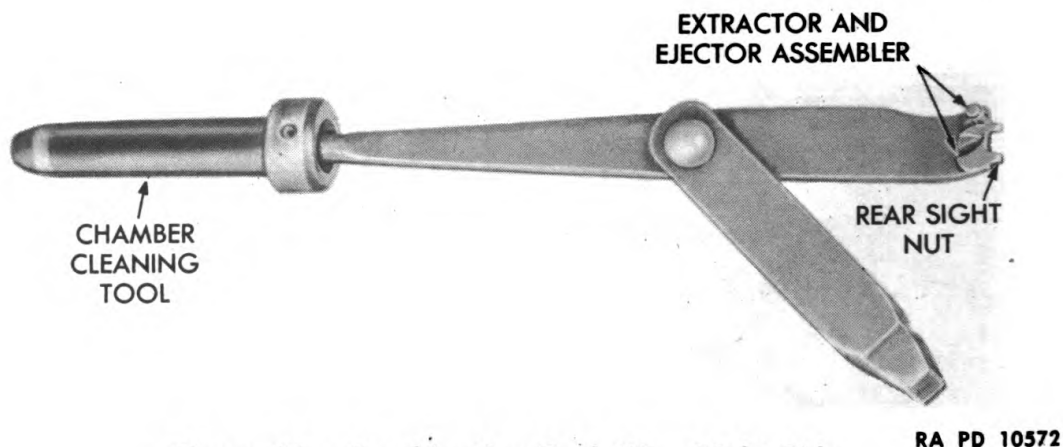


Figure 33 — Combination Tool M3 — Right Side

57. DISASSEMBLY OF STOCK GROUP.

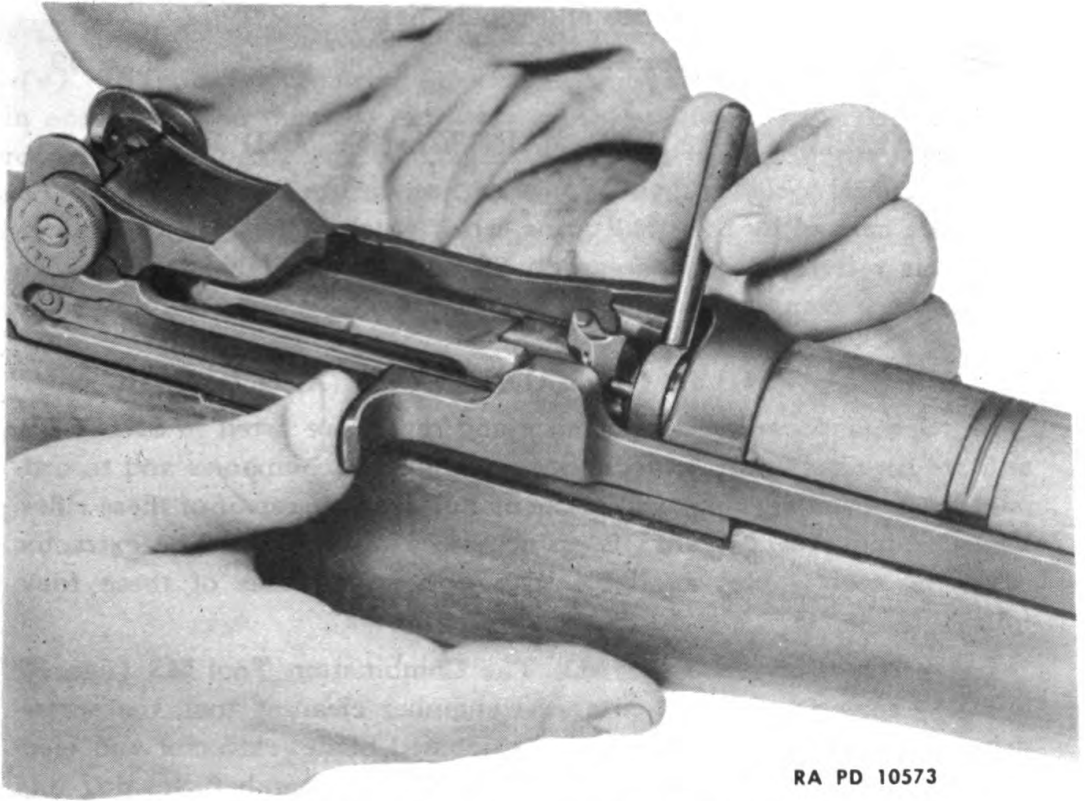
a. Disassembly of this group consists of removing the butt plate, rear swivel, and front swivel from the stock; however, these parts are never removed unless they or the stock are to be replaced. Proceed as follows:

(1) The butt plate is removed by unscrewing the wood screw which retains the heel end to the stock. Then unscrew the toe screw, which is a machine screw retaining the swivel in the stock. The inner end of the swivel is threaded for this purpose.

NOTE: The butt plate is fitted with a hinged cap to retain the oiler and thong case and the combination tool in the stock.

DISASSEMBLY

(2) Remove the stock ferrule swivel and stock ferrule by unscrewing the stock ferrule screw. Normally the end of this screw is peened over to prevent its coming loose in service, so that the screw must be replaced if removed.



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Figure 34 — Extractor Removing Tool in Use

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Section VII

TOOLS FOR MAINTENANCE AND REPAIR

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General tools for maintenance and repair.....	58
Special tools for maintenance and repair.....	59

58. GENERAL TOOLS FOR MAINTENANCE AND REPAIR.

a. General tools for maintenance and repair are listed in SNL G-72. They are carried by the small arms repair truck in addition to the special tools referred to in paragraph 59 and are available to ordnance maintenance companies.

59. SPECIAL TOOLS FOR MAINTENANCE AND REPAIR.

a. Special tools for maintenance and repair are listed in SNL B-20, and are furnished only to ordnance maintenance companies and to ordnance establishments engaged in the manufacture or repair of these rifles. The Combination Tool M3 is an accessory of the rifle. The extractor removing tool is also available. Description and uses of these tools follow.

(1) COMBINATION TOOL M3. The Combination Tool M3 (figs. 32 and 33) consists of three parts: the chamber cleaning tool; the screwdriver blade, and the handle with its notched blade; extractor and ejector assembler, pin drift and hand extractor. The chamber cleaning tool has a slot for the attachment of a cleaning patch. The movable screwdriver blade is used for the gas cylinder plug screw and various other screws. The notched blade at the end of the handle is used on the rear sight nut. The pin drift is used not only to drift out pins, but is also used in conjunction with the V-shaped groove cut into the face of the handle to assemble the extractor and ejector. The curved undercut hook or hand extractor, is used to extract a cartridge case after firing if the extractor of the rifle should fail.

(2) EXTRACTOR REMOVING TOOL. The extractor removing tool (fig. 13) is composed of two parts: a cylindrical spindle, and a ring with a pin lug and handle attached. The tool is used to remove and replace the firing pin without disassembling the rifle. This is done as follows:

(a) Retract the bolt and insert the spindle of the tool into the chamber of the barrel until the shoulder of the tool has bearing.

(b) Allow the bolt to close slowly, turning the ring with the handle so that the lug of the ring is under the extractor (fig. 34).

TOOLS FOR MAINTENANCE AND REPAIR

(c) Hold the bolt closed against the ring of the tool, and turn the ring counterclockwise so that the lug on the ring pushes the extractor out of its seat and out of engagement with the ejector.

(d) Retract the bolt *slowly*, thus allowing the ejector and extractor plunger springs to release. The firing pin can then be withdrawn from its well, and the new firing pin assembled from the rear of the receiver.

(e) In replacing the firing pin, care must be observed to position the pin and ejector so that the extractor spindle will engage their notches properly before being pushed home. At no time should undue force be used. When the extractor is properly seated (flush) in its notch in the bolt, retract the bolt and withdraw the tool from the chamber.

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Section VIII

INSPECTION AND REPAIR AFTER DISASSEMBLY

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60. GENERAL.

a. Maintenance and repair of the rifle is primarily a replacement of worn or broken parts.

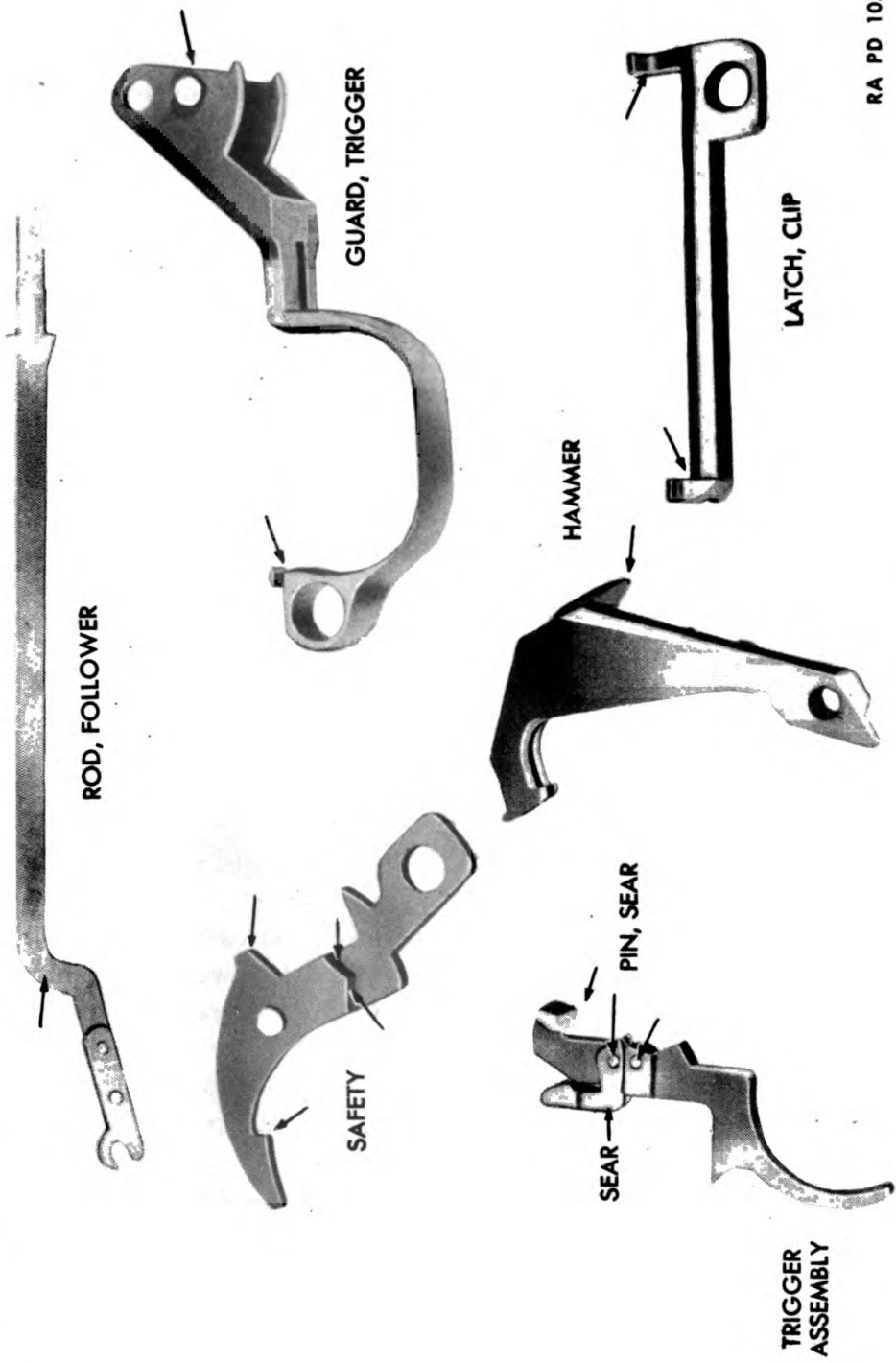
b. Where parts or assemblies, or parts of assemblies are broken or so worn as to render them unserviceable, they must be replaced from stock. Often, only parts of assemblies will be worn or broken, but if it takes more time to remove the serviceable parts from the assembly than the parts are worth, the entire assembly should be replaced.

c. Maintenance operations are performed by qualified ordnance personnel with the facilities afforded by repair trucks, or by semipermanent shops at posts or camps, or by an inspector while making a regular inspection. Typical operations in the maintenance of the rifle are described in the following paragraphs.

61. BURS ON SCREWHEADS, CAMS, AND CONTACTING SURFACES.

a. Remove any burs on screwheads with a fine file. Remove burs from cams and smooth contacting metal surfaces with a fine grained sharpening stone. Polish rounded surfaces with CLOTH, crocus, if necessary. Care should be observed to stone and file evenly and lightly, removing only as little of the metal as necessary. On critical surfaces,

INSPECTION AND REPAIR AFTER DISASSEMBLY



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Figure 35 — Trigger Housing Parts, Follower Rod, and Clip Latch Showing Important Points to be Inspected

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stone to a polish only. Press on the file or stone on the forward stroke only.

62. BURRED, SCORED, AND PROTRUDING WOOD SURFACES.

a. Remove burs, rough protrusions or scorings, and protruding wood surfaces with a fine, flat file or fine abrasive. Always file towards an edge so as not to pick up slivers or chips. Press on the file on the forward stroke only. Smooth off with fine abrasive where necessary, and oil with OIL, linseed, raw.

63. FOREIGN MATTER IN RIFLE MECHANISMS (fig. 35).

a. Foreign matter in mechanisms may prevent proper functioning of the rifle and should be removed. Important points to check are as follows: the cam recess in the operating rod handle, the bolt ways and lug recesses in the firing pin well, the extractor plunger spring, the ejector wells, the hammer spring housing, the operating rod tube, the rear sight base and aperture, the elevating knob screw, the trigger mechanism especially under the heel of the sear, and the trigger lug.

64. BARREL AND RECEIVER GROUP.

a. **Follower Rod and Operating Rod Spring (fig. 36).** Test the function of the follower rod with the follower arm for free action and for free action in the slot in the operating rod catch. Check the rod for deformation, a pinched or worn fork, loose rivets, and for burs. Check the operating rod spring and the compensating spring when present for kinks.

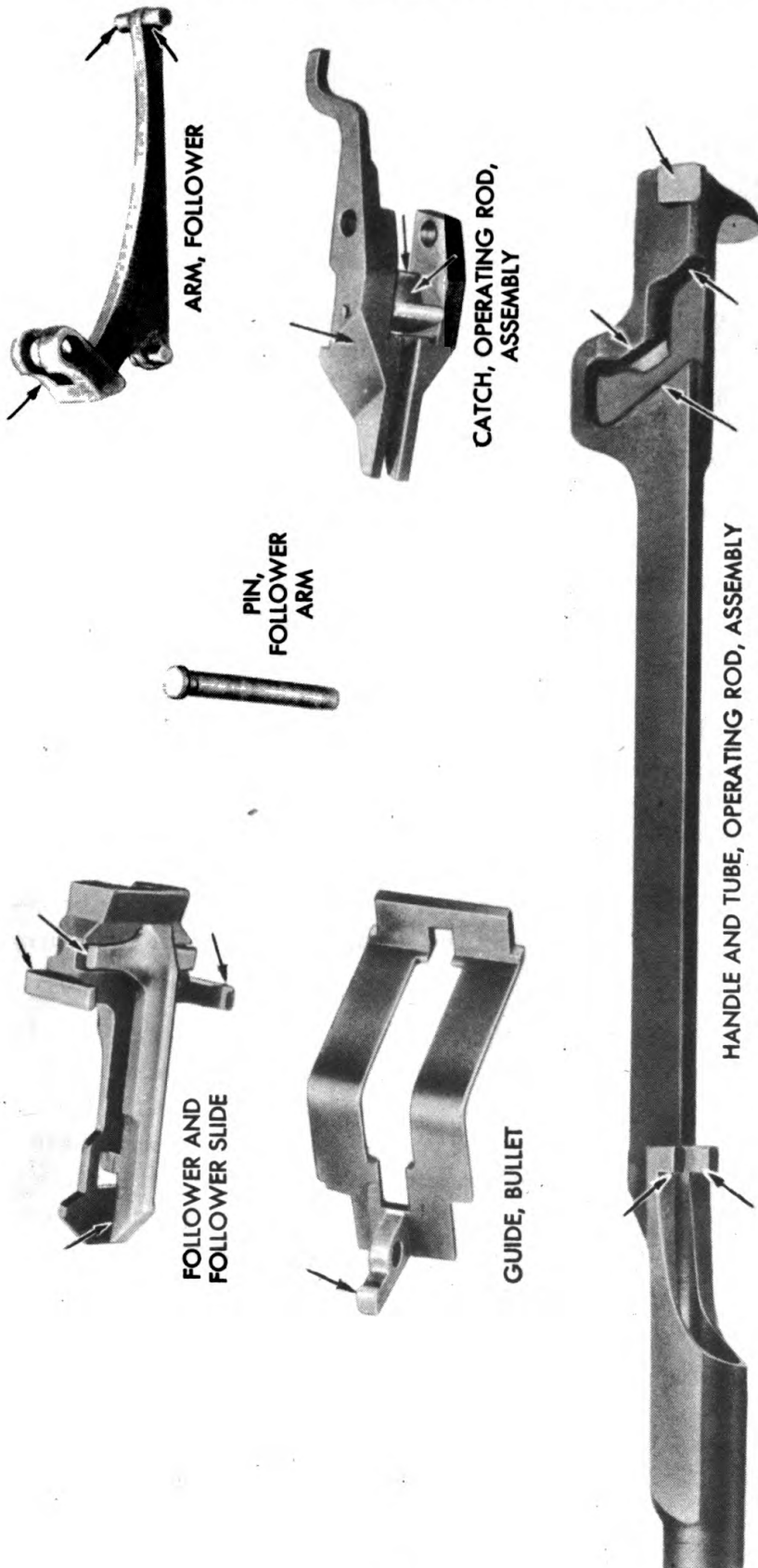
b. **Operating Rod Catch Assembly, Follower Arm, and Bullet Guide.**

(1) **OPERATING ROD CATCH.** Test the operating rod catch for function and free action. It should pivot freely on the follower arm pin. Also check for deformation, a worn or burred notch, a burred, worn or "wavy" slot, and a worn or burred clip latch stud. Test the accelerator for function, free rotation on the pin, a loose or bent pin, wear, and burs. Do not disassemble the accelerator unless necessary as the pin is riveted in its seat.

(2) **FOLLOWER ARM (fig. 36).** Test the follower arm for function with the follower and for free rotation on the pin. Check for deformation, wear, burs, loose pin, and worn or burred T-lug. Check the top surface (camming accelerator) for burs.

NOTE: A bend of the follower arm in a vertical plane will affect the timing of the mechanism. If the rear end of the arm is bent *up*, the operating rod catch will release early and the bolt snap forward as the

INSPECTION AND REPAIR AFTER DISASSEMBLY



RA PD 10575

Figure 36 — Parts of Receiver Group Showing Important Points to be Inspected

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clip is inserted, or the bolt may close on an empty chamber. If bent down, the catch will engage too early and the clip be ejected while still holding the eighth, or seventh and eighth round. Loading may also be affected as the catch will not release properly.

(3) **BULLET GUIDE** (fig. 36). Check the bullet guide for deformation, looseness on the follower arm pin, wear, and burs. Check the lug which contacts the accelerator for burs.

c. **Follower and Slide** (fig. 37). Check the follower for function, wear in the follower arm T-lug ways, free action, burs on the side rails and worn bearing points, and for burs. Check the follower slide for free action with the follower and for burs. The slide and the follower should not be disassembled except to replace or repair the slide.

d. **Operating Rod**. Test the operating rod for free movement by assembling it without the bolt or spring. Check the tube for dents and the handle for deformation, which will cause binding of the under side of the lug on the cut in the receiver. Check the operating rod handle (fig. 36) for wear and foreign matter in the cam recess and for wear and burs on the camming faces of recess. Check the rod for binding with the under side of the barrel at the chamber, and at the stock ferule. Check the rod for burs and the inner side of the operating rod handle lug for wear. Check the piston for scoring and the accumulation of excessive carbon. Check the rod back of the piston for rust. The rod should move freely when not assembled to the operating spring. New rifles may work stiffly until broken in. The operating rod tube is slightly bent to provide clearance at the enlarged portion of the barrel. This bend should *not* be removed.

e. **Bolt Group** (fig. 37).

(1) **BOLT**. Test the bolt while it is free for freedom and smoothness of movement, and for locking. Check for wear on the face, worn or burred locking lugs and cam surfaces, and burs. Inspect the firing pin carefully, the extractor plunger spring, and the ejector for foreign matter. Check the ejector carefully for burs. Check the clearance cut on the right side and the cartridge clip channels for burs.

(2) **FIRING PIN**. Test the firing pin for freedom of movement, deformation, wear on the front and rear bearing surfaces, and for burs on the nose and heel. The firing pin nose can protrude 0.004 inch maximum, and recede 0.022 inch maximum from the bolt face when not in the fired position. In the fired position, the nose should protrude 0.030 to 0.065 inch.

(3) **EXTRACTOR**. Test the extractor for grip on the cartridge base, and the extractor spring for tension. Check the spring for kinks and a

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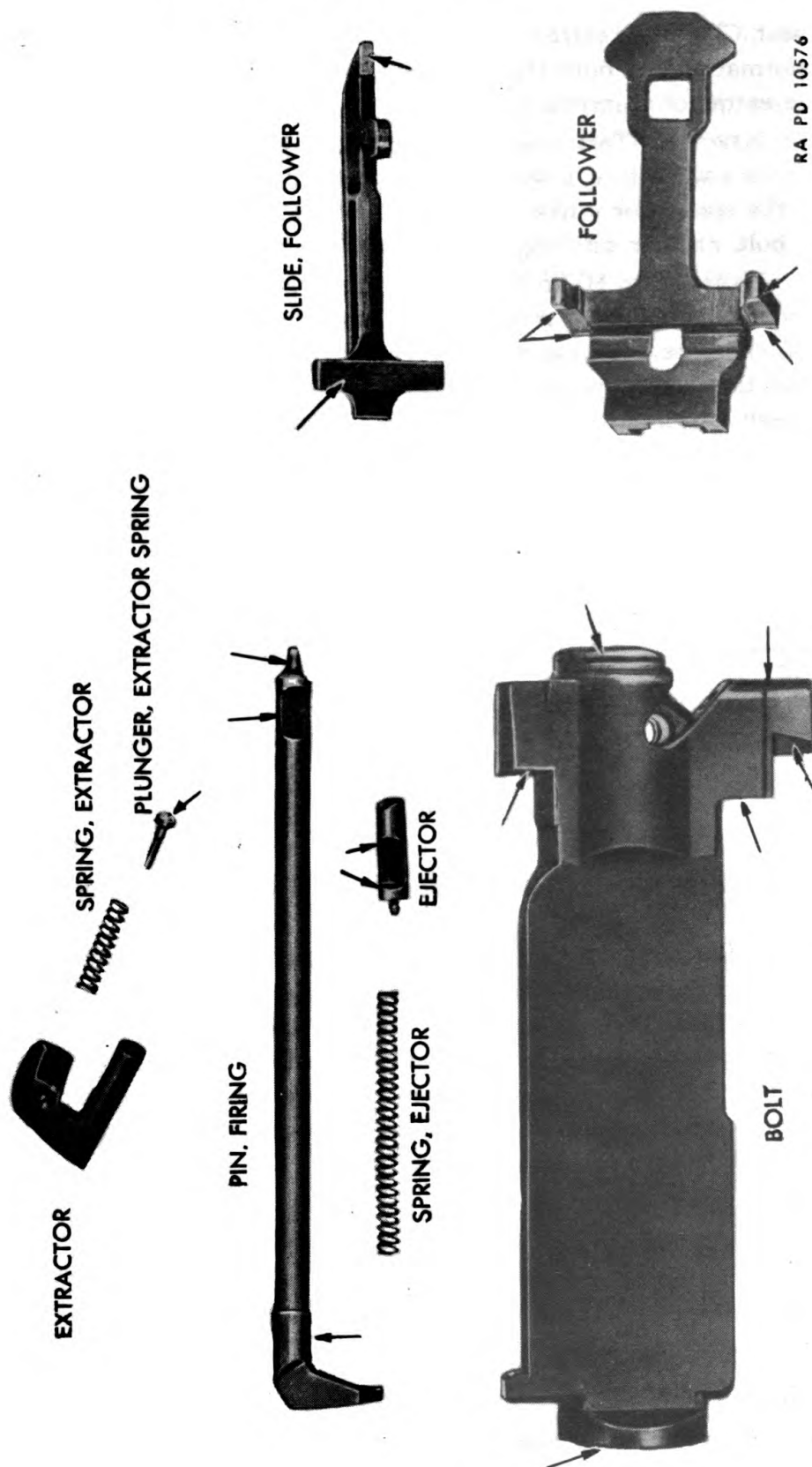


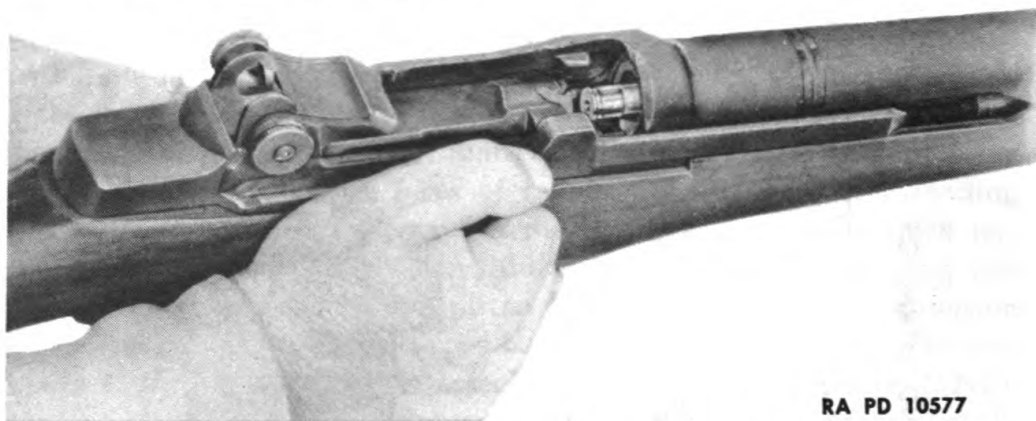
Figure 37 — Follower and Follower Slide, Firing Pin, and Bolt Assembly Showing Important Points to be Inspected

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level seat. Check the extractor for burs and a worn face, and the plunger for deformation and burs. Hold the thumb over the ejector when removing the extractor to prevent the spring from flying out.

(4) **EJECTOR.** Test the tension of the ejector spring. Check the ejector for a worn face, a worn extractor retention groove, and for burs. Check the spring for kinks and a level seat. Check for free movement in the bolt, and for binding with the extractor spindle.

(5) **NEW BOLT HARD TO CLOSE.** After a new bolt has been assembled, it should close freely on the 1.940-inch head space gage. If the first one does not close on the gage, others should be tried until one is found that closes properly on the gage (fig. 38). The bolt should close freely on the 1.942-inch head space gage, but should not close on the 1.946-inch head space gage.



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Figure 38 — Using Head Space Gage to Check New Bolt

f. **Clip Latch** (fig. 35). Check the clip latch for freedom of movement without the spring. Check for wear and burs on the retention hook and the lug face. Test the spring for tension, and kinks and level seating. The large end of the spring should be seated in the clip latch and the small end in the seating recess in the receiver. The clip latch pin must not protrude when assembled, for if it does, it will damage the stock. Check the pin for looseness and burs.

g. **Receiver.** Inspect the receiver for wear and burs in the ways and contacting surfaces. Check the pin holes and lug recesses for wear. Check the rear sight mounting wings for tightness. Check the firing pin camming surface in the top of the bridge, and the firing pin recess for burs.

h. Rear Sight.

(1) When the front end of the aperture rack binds between the sight cover and the receiver groove, remove a small amount of metal

INSPECTION AND REPAIR AFTER DISASSEMBLY

from the under side of the front end of the rack and round off all sharp corners with a sharpening stone.

(2) Looseness of the rear sight is usually due to improper spring tension. Tension in both the elevating knob and windage knob is adjustable by means of the rear sight nut located in the windage knob. The normal tension setting is to tighten until solid; then back off the nut 3 or 4 clicks. If it is too tight or too loose, change a click at a time. A slight outward pull will relieve the strain of turning the knobs.

(3) Looseness of the rear sight aperture is usually due to insufficient spring pressure of the cover. The pressure can be increased by a slight downward bend of the cover at its ridge. Pressure is relieved by reversing this action. Care should be taken to make sure the rear end of the cover seats properly in its recess in the receiver after bending. For stiffening the new type cover, there is a cross indentation, which bears on the aperture rack, and longitudinal indentations on the sides.

(4) Where threads are damaged in the rear sight nut, they can be chased out with a No. 6-40NF-3 tap.

(5) The nut lock may become damaged, burred, or jammed through improper assembly. The flat on the lock must match the flat on the tip of the elevating pinion shank. Remove the burs and check for freedom of spring action. With the spring compressed to 0.160 inch, the load should not be less than 6 pounds nor more than 8 pounds.

(6) Where the threads are damaged on the windage knob they can be chased out with a $\frac{5}{16}$ -inch 32NS die. Care should be taken to set the die to the original diameter of the thread so as not to reduce its diameter. Except in emergencies, parts with badly damaged threads should be replaced.

(7) Where threads for windage knob in the rear sight base are damaged, they can be chased out with a $\frac{5}{16}$ -inch 32NS bottoming tap.

(8) If threads of the spindle engaging rear sight nut are damaged, they can be chased out with a No. 6-40NF-3 die. If threads of the elevating knob screw are damaged, use No. 10-32NF-3 bottoming tap.

(9) When the rear sight jumps, the cause may be improper adjustment of the rear sight nut or the elevating knob. The knob may be extended far enough over the pinion head to rub against the side of the receiver and thus hold the serrations on the pinion head out of engagement with the mating serrations on the receiver. The inner surface of the elevating knob rim can be dressed off sufficiently with a sharpening stone to allow the serrations to mate.

i. Barrel.

(1) Check the barrel threads for looseness in the receiver and in

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the gas cylinder lock. Inspect the gas port in the barrel for rust and foreign matter; check the outside of barrel, where it contacts the gas cylinder, for rust that is due to gas action. Inspect the barrel for serviceability. Inspect the barrel for bulges, erosion, and pits. The barrel is checked by visual inspection from the muzzle end, as described in section V; from the breech, as described below; and by bore gaging. Before any attempt is made to inspect a barrel for serviceability, fouling and oil should be removed and the bore wiped dry.

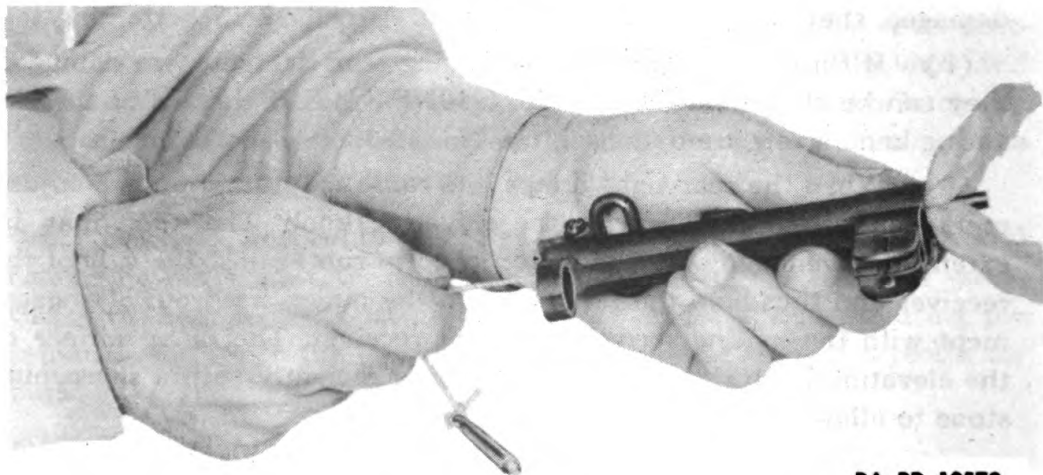
(2) **INSPECTION FROM BREECH.** During the inspection of the bore from the breech, special attention should be given to the chamber. Pits make extraction difficult and may cause the cartridge case to stick in the chamber sufficiently to cause failure to extract. Barrels that have pits large enough to cause cartridges to stick in the chamber should be considered unserviceable and scrapped. (See section V for information on bore gaging and head space gaging.)

65. GAS CYLINDER GROUP.

a. **Gas Cylinder.** If the gas cylinder is dented so that there is binding, it should be replaced. It is impracticable to straighten the gas cylinder.

b. If alinement is unsatisfactory (as shown by alinement tests in section V), and cannot be corrected by substituting other plugs, the gas cylinder is defective and should be repaired.

c. **Carbon Will Accumulate Due to Firing.** The speed of accumulation is a factor peculiar to individual rifles. Excess deposits of carbon in the gas cylinder group are indicated by sluggishness in the action and failure to feed. Remove carbon as follows:



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Figure 39 — Removing Carbon from Gas Cylinder

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(1) **SCREW-ON TYPE.** Remove the gas cylinder plug screw and plug. Scrape the carbon from the exposed surface of the front of the gas cylinder, the gas cylinder plug, and the grooves in the gas cylinder to insure correct seating of the plug. A sharp bladed instrument or fine abrasive cloth should be used to remove the carbon from the gas cylinder plug and piston head. Care should be taken that the edges of the plug do not become rounded. *Do not remove the gas cylinder for cleaning.* The gas cylinder is cleaned by using a cleaning rod and a patch in the same manner that the bore is cleaned. Remove any rust on the outside of the cylinder or the barrel where they contact with FLUID, bore-cleaning, or fine abrasive.

(2) **SPLINE TYPE.** To remove accumulated deposits of carbon from the gas cylinder, remove the lock screw and remove the carbon with the screwdriver blade of the combination tool or a similar instrument. The gas cylinder lock may be removed and the screw reinserted in the gas cylinder and threaded in enough to break loose the carbon. Care should be taken not to cross the threads. The gas cylinder port can be cleaned with a straight punch or the drift on the combination tool. The inside of the gas cylinder should be thoroughly wiped clean (fig. 39) and oiled. A few drops of oil placed between the rear gas cylinder lug and the operating rod, with the muzzle tipped down, will be sufficient. Hand operate the rod through a few cycles to distribute the oil properly. Remove any rust on the outside of the cylinder, using FLUID, bore-cleaning, or fine abrasive. Rust on the barrel at this point should be removed in a similar manner.

d. Carbon on the head of the piston can be removed in a similar manner. Care should be taken not to round the edges of the piston. Rust on the rod or tube in the rear of the head can be removed with the FLUID, bore-cleaning, or fine abrasive.

e. If the bayonet lug is worn to a loose fit with the bayonet lug ways, the lug may be peened lightly to better fit with the ways in the bayonet. Rest the *lug only* on a solid surface when peening; however, this practice is not recommended except in emergency, due to the fact that the lug is a part of the gas cylinder. Remove burs with a fine file or hammer them down lightly and then file.

f. Difficulty may be experienced in fitting the bayonet to the rifle due to excessive thickness of the lock or lack of concentricity. This should be rectified by grinding or filing the portion of the gas cylinder lock that fits inside the bayonet guard.

g. A loose front sight can be tightened by removing the front sight screw seal, adjusting the sight, on range to zero windage for the rifle, then

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tightening the screw. To remove the seal, file off its exposed surface, and with a $\frac{3}{16}$ inch hexagonal socket head set screw wrench BCTXIL, back out the screw. Replace and tighten the screw. Then place a new seal over the screwhead and seat it firmly with a hammer.

66. TRIGGER HOUSING GROUP.

a. **Trigger Guard.** Check the trigger guard for deformation, and the locking lugs and hammer stop for wear and burs. Check the latch for retention, wear, and burs. When the bow in the trigger guard is bent up so as to interfere with the tip of the trigger, it can be straightened or the tip of trigger ground off. Check the locking action. When the trigger guard locking lugs become worn, they can be peened lightly to resize them and then dressed to shape with a fine file (fig. 40). The trigger guard fork may become sprung in, thus causing binding, or sprung out, thus preventing the hammer pin from extending far enough through for a proper bearing. These faults can be corrected by springing the fork back into correct position.

b. It has been noted that excessive force is sometimes required to close the trigger guard on U. S. Rifle, cal. .30, M1. This is usually encoun-



Figure 40 — Lightly Peening Lugs on Trigger Guard to Correct Looseness of Stock on Receiver

INSPECTION AND REPAIR AFTER DISASSEMBLY

tered in humid climates and is the result of the stock swelling due to an increased moisture content. When this condition is encountered, it may be corrected by the following method. With a fine wood rasp or file remove 0.005 inch to 0.015 inch of wood from the under side of the stock along the bearing surface of the trigger group. This surface is at a 10 degree angle to the horizontal. Extreme care must be exercised to maintain the 10 degree angle and to remove the same amount of wood from both sides of the stock. As wood is removed, the force required to lock the trigger guard should be determined by frequent reassembly. Reasonable, but not excessive, force should be required to close the trigger guard. The trigger guard must not be loose as this is the only point at which the action is locked in its bedding.

c. **Trigger.** Check the trigger lugs for alinement with each other and for squareness of contact with the faces of the hammer hooks. Also check for wear and burs.

d. **Creep in Trigger.** Slightly rough contacting surfaces of the trigger lug may cause "creep" in the trigger, and should be removed with a fine sharpening stone. Stone to a polish only, being careful to maintain proper level and angle.

e. **Sear.** Test the function and free movement of the sear. Check the sear contacting surface for levelness and seating with the hammer hooks. Check the sear for looseness on the pin and for burs. Check the pin for looseness, protrusion, and staking. The sear should pivot freely on the pin, and rock slightly, but have no side play.

f. **Hammer.** Test the hammer for function and free action. Test the tension of the hammer spring (free length approximately 2.187 inches). Test the hammer for retention with the trigger lugs, the sear and safety hook. Check the contacting surfaces of the hooks for levelness with each other and for squareness of contact with the trigger lugs and the sear. Check the safety lug for retentive contact with the safety hook and for wear and burs. Check the hammer for free pivoting on the pin, and the pin for wear and burs. Check the hammer spring housing for foreign matter, roughness on the fork surfaces, and for looseness on the trigger pin. Check the hammer spring plunger for deformation and the nose for wear and burs. Check the nose of the hammer for wear and burs, and the top of the bolt camming surface for roughness.

g. **Safety.** Check the safety for deformation, for retention, and for wear and burs. Check the hook for squareness of the face which contacts the hammer lug. Check the lug for wear and burs.

h. **Bent Safety.** When the safety is bent, so that it binds in the trigger

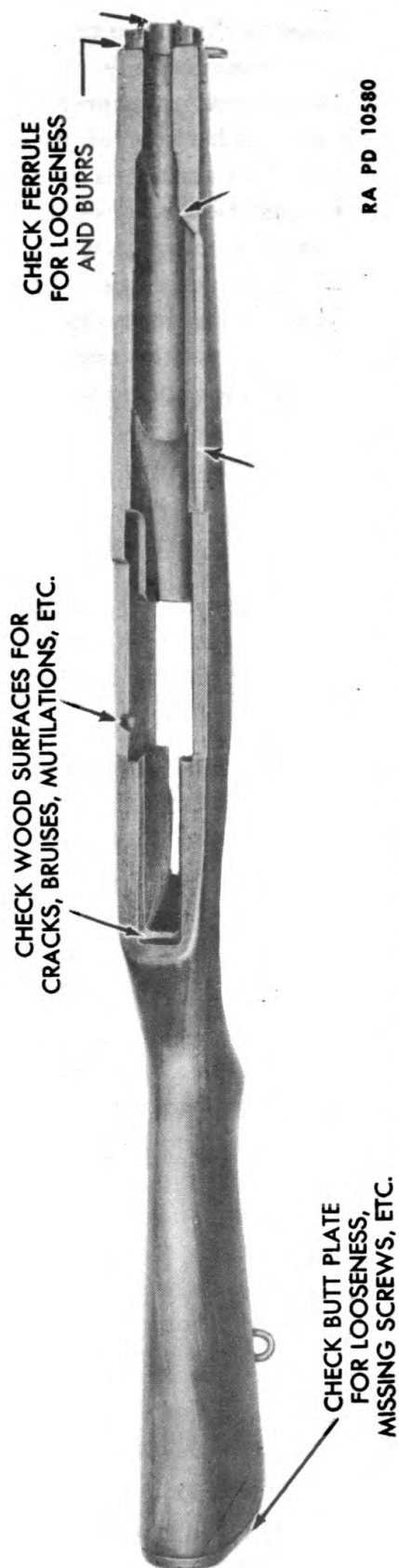


Figure 41 — Stock Group Showing Points to be Inspected — Top View

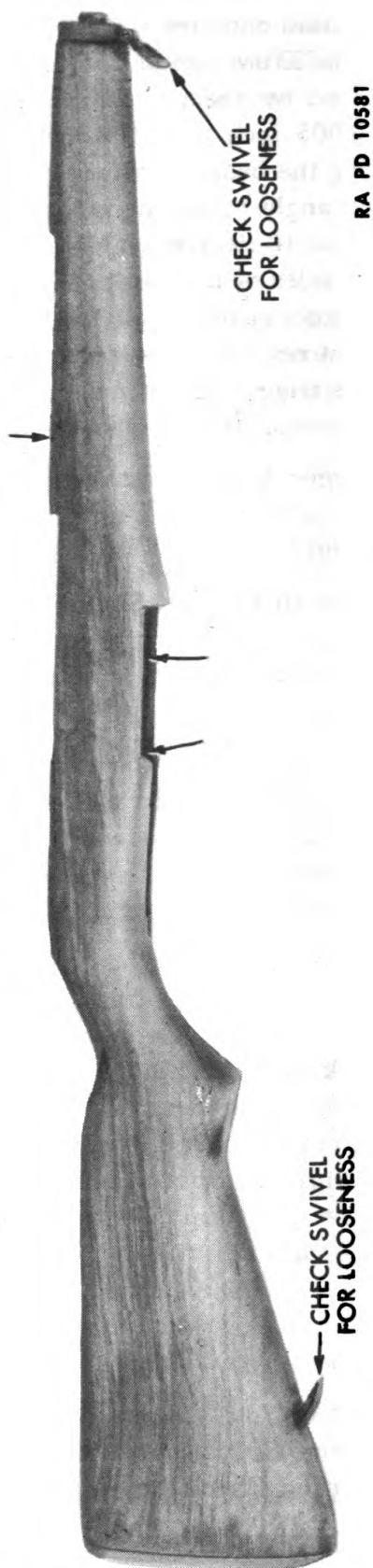


Figure 42 — Stock Group Showing Points to be Inspected — Side View

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guard cut, it should be replaced. It cannot be straightened because it is hardened steel.

i. **Clip Ejector.** Test the tension of clip ejector. Check the function of the clip ejector (short upper arm) with the V-lug on the safety (left side).

67. STOCK GROUP (figs. 41 and 42).

a. **Stock.** Check relief cuts for signs of binding with adjacent assemblies and parts.

b. Hand Guards.

(1) **SPLIT OR LOOSE FRONT HAND GUARD.** It is not necessary to replace the guard if serviceable and it holds firmly in position. When replacing, shave the new guard to a tight fit under the bands.

(2) **SPLIT OR LOOSE REAR HAND GUARD.** It is not necessary to replace the guard if serviceable. If it is loose, remove and spring the band together slightly, and refit the guard.

(3) **LOWER BAND PIN LOOSE OR MISSING.** A loose or missing lower band pin may allow the band to rotate slightly on the barrel and rub or bind the operating rod. Restake a loose pin, or replace and stake.

c. Stock Loose On Receiver; and Dry Wood.

(1) Loose stock may be caused by wear of locking lugs on trigger guard because they are of softer metal than mating surfaces in receiver. Trouble may be remedied by replacing trigger guard or lightly peening the lugs. If this does not remedy trouble, replace stock with new assembly.

(2) When fitting a new stock, check all clearance cuts to see that there is no binding or interference with the parts concerned. Stocks although made of walnut and treated with linseed oil sometimes swell, due to moisture, thus causing binding of parts in cuts, or protrusion of wood beyond metal surfaces, such as butt plate, ferrule, bands, etc. In such cases relieve binding, and bevel protrusions with fine, flat file with safe edge to prevent splintering or chipping. Always file *towards* sharp edges. Care should be used to remove only a little wood at a time, as it cannot be replaced.

(3) In dry climates wood parts of the rifle are apt to dry out and shrink. Occasional applications of OIL, linseed, raw, will help keep wood in condition. Apply oil to wood *only*, allow to remain a few hours to soak in. Then wipe off and polish wood with clean, dry rag. Care must be exercised not to allow linseed oil to get into crevices or mechanisms as it will "gum up" when dry.

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d. Fitting New Stock. When fitting a new stock, check all clearance cuts to see that there is no binding or interference with the parts concerned.

e. Binding and Malfunctions of Operating Parts Due to Insufficient Clearance. Swelling in, or ill fitting of the stock may cause binding at certain points which will seriously interfere with the proper functioning of the adjacent parts and mechanisms. Some of such points are:

(1) **CLIP LATCH CUT.** Insufficient clearance may bind the clip latch and cause the operating rod catch to release the rod before the clip is seated and latched, or cause the clip to be ejected prematurely. Remove the obstructing wood as explained in sub-paragraph c (2) of this paragraph.

(2) **TRIGGER HOUSING GROUP CUT.** Insufficient clearance may cause the housing to be crowded in closing. Remove enough wood (a little at a time and evenly from both sides) to insure proper closing. If the wood is removed from the under faces of the cut, where the bottom plate rests on the stock, the 10 degree angle must be maintained, or else the edges of the plate will wear a depression in the wood and make it difficult to lock the trigger guard.

(3) **REAR END OF TRIGGER GROUP NOTCH.** Insufficient clearance at this point may interfere with free trigger action. Remove the wood gradually until the trigger action is free.

(4) **OPERATING ROD CUT.** Binding at this point may seriously interfere with the function of the operating rod. Relieve where necessary.

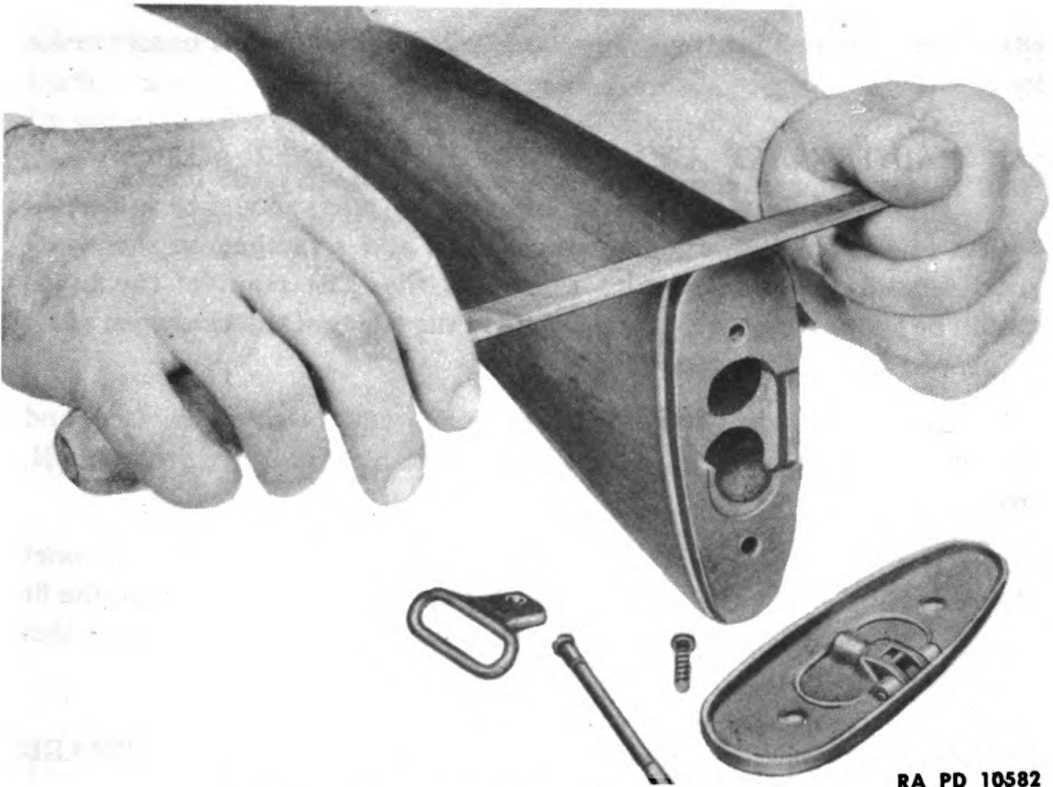
f. Butt Plate Recessing.

(1) If the new type butt plate is not let into the stock properly, or if the wood of the butt overhangs an old style plate, due to ill fitting or swelling of the wood, there is danger of splintering and chipping at points where the wood fails to meet the plate.

(2) Remove the plate by tapping it lightly to loosen it, then prying being careful not to damage the butt (fig. 43). File the butt enough to seat the plate with a close fit all around. Frequent fitting should be done while filing to prevent the removal of too much wood, or forming of an uneven bearing. Use a medium fine flat file (never coarse) and file evenly and smoothly. Always file the butt *from heel to toe* and stroke forward only. It is advisable to put a very slight chamfer on sharp edges to prevent picking up splinters while filing.

(3) Where wood protrudes beyond the metal of the butt plate, remove the wood until flush with the plate. Use a fine flat file. If necessary to remove wood from the step of a new style butt, use a file with a safe edge.

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Figure 43 — Fitting Butt Plate on Stock

(4) If the short butt plate screw threaded in the wood binds too much when screwing it home, withdraw it. Soap the threads and try again. Never use undue force on this screw or the threads in wood of stock may be stripped. If this occurs or if screw is too loose in its threaded hole, bore the hole out with a *drill* to about twice the major (outside) diameter of the screw. Fashion, from wood, a cylindrical plug to an easy drive fit and coat it with glue. Clean out the hole thoroughly and drive the plug to the bottom. Be sure the plug is not too tight as it will split the stock. When the glue is dry, cut the plug off and file it flush with the face of the butt. Then drill a hole in the plug with a diameter corresponding to the minor (bottom of thread) diameter of the screw, centering it with a prick punch, and using the butt plate as a template. Rout the threads in the plug if a *thread router* is available. Soap the screw and screw it in the hole, backing the screw off now and then to prevent thread crowding. If the screw crowds the hole too much, remove the screw and ream out the hole slightly. Do not use undue force.

g. Operating Rod Binding on Stock Ferrule. When binding of the operating rod occurs at the lower band, it may be remedied by removal of a small amount of metal from the lower band, or by spreading the lower band sufficiently for the rod to clear properly. Before correcting,

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check the alinement of the lower band and check the lower band pin for looseness.

68. MAINTENANCE AND REPAIR OF BAYONET M1905.

a. **Nicks and Burs.** Nicks and burs on metal parts should be smoothed with a fine grained sharpening stone. Burs and scratches on the wood grips should be smoothed with a fine flat file. The point of the blade should be kept serviceably sharp. Dents in the edges of the blade can often be peened out before smoothing.

b. **Loose Rivet in Guard.** Peen, or punch out the rivets, replace, and rerivet; file the heads flush with a fine flat file and polish with CLOTH, crocus, if necessary.

c. **Worn Lug Ways.** When the lug ways are worn so the bayonet fits too loosely on the rifle, the ways may be lightly peened to make the fit secure. The bayonet should be fitted to the lug frequently during this procedure.

69. MAINTENANCE AND REPAIR OF BAYONET SCABBARD M3 (fig. 44).

a. **Nicks and Burs.** Nicks and burs on the top of the mouthpiece should be removed with a smooth file. A flat file with a safe edge should be used for flat surfaces and a rattail file for inside radii.

b. **Top Loose from Body.** If the top becomes loosened from the body, it may be tightened by springing the lugs of the metal top into the notches in the body of the scabbard.

70. MAINTENANCE AND REPAIR OF BAYONET SCABBARD M1910.

a. **Nicks and Burs.** Nicks and burs on the top of the mouthpiece or the top bushing, should be removed with a smooth file. A flat file, with a safe edge should be used for flat surfaces and a rattail file for inside radii.

b. **Top Loose From Body.** If the top becomes loose from the metal of the body, it may be tightened by placing a piece of flat metal in the blade opening to prevent springing, and then placing the scabbard on a solid edge of a flat surface (such as the anvil of a vise) so that the rim of the top does not make contact. Then separate the cover from the rim of the top, insert a thin cold chisel and lightly hammer just back of the rim. The metal body is crimped into a groove in the top just back of the beveled rim. Care must be exercised since the main body of the scabbard is of wood.

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c. **Scratched or Gouged Leather Reinforcement.** Rough spots on the leather reinforcement, caused by scratches or gouges, may be smoothed by paring with a sharp, flat blade.

d. **Dried-out (Dead) Leather.** An occasional cleaning with SOAP, castile, or SOAP, saddle, will help to keep leather from drying out.

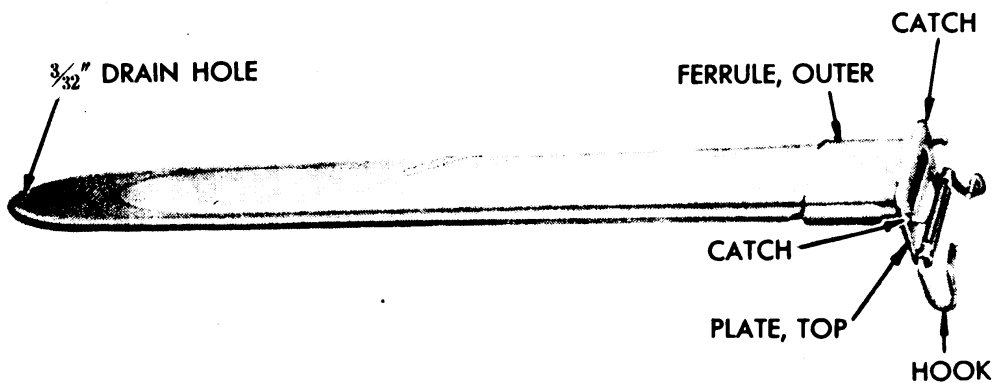


Figure 44 — Bayonet Scabbard M3

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71. MAINTENANCE AND REPAIR OF GUN SLING M1907.

a. **Dried-out Leather.** When straps become dried out, as indicated by light cracking or stiffness, a thorough cleaning with SOAP, castile, or SOAP, saddle, will help condition the leather. A thick lather of soap should be worked into the leather and allowed to remain for a short while. Then rub off the residue and briskly polish with a dry, clean rag.

b. **Scratches and Gouges.** When straps become roughened by scratches, cuts or gouges they may be smoothed by paring lightly with a sharp, flat blade.

c. **Bent Sliding Loops and Hooks.** When sliding loops or hooks become spread or pinched, they should be corrected. Loops may be spread by placing a piece of flat metal between loop and strap and using a light hammer.

d. **Worn Holes in Straps.** When the holes in the straps become worn or the leather is torn between the holes, the strap should be replaced. Punching new holes will weaken the strap.

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Section IX

ASSEMBLY

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72. GENERAL.

a. In this section the step by step assembly of each of the major groups of the rifle is first described, followed by the assembly of these major groups into the completely assembled rifle.

b. All parts should be thoroughly cleaned and oiled before assembly.

73. ASSEMBLY OF STOCK GROUP.

a. Assembly of this group is required only if the butt plate, rear swivel, or front swivel have been removed from the stock.

(1) The butt plate is assembled by inserting the wood screw which retains the heel end of the plate to the stock, followed by inserting and tightening the toe screw. The toe screw is threaded into the rear swivel which is inserted in the slot in the stock and brought into alinement with the toe screw.

(2) If the stock ferrule swivel and stock ferrule have been removed, a new stock ferrule screw must be used when this part is assembled to the stock. After inserting the stock ferrule screw, its end is peened over to prevent its coming loose in service.

74. ASSEMBLY OF TRIGGER HOUSING GROUP.

a. Place clip ejector in position in trigger housing with short arm up, tip of long arm in its slot in vertical front face of housing, and loop against its stud on left side of trigger housing. Hold trigger housing with its left side down, rear end to the right. With right thumb hold loop of clip ejector against its stud; with forefinger of left hand hold long arm of clip ejector up in its slot in front face of trigger housing. With left thumb pry toward body, near left end, of long arm of clip ejector, thereby seating it.

b. Hold trigger housing in left hand, top up, forward end to front.

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Hold trigger guard in right hand, winged section pointing to the left. Place winged sections astride bottom of trigger housing, hammer stop over safety slot. Rotate trigger guard downward, then slide it forward into position.

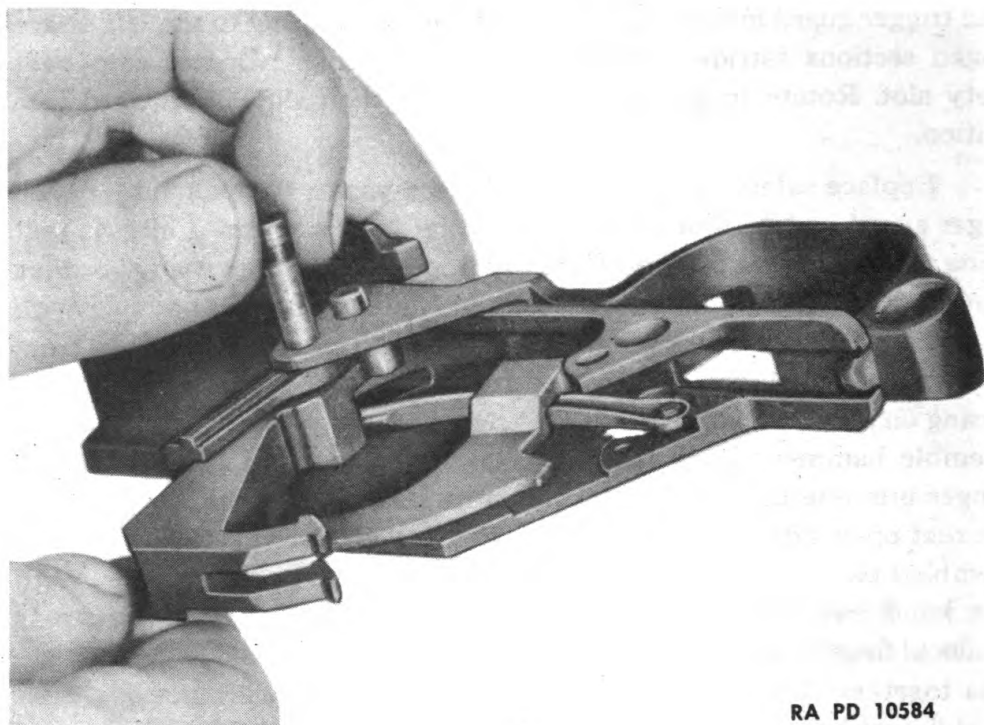
c. Replace safety so that its thumbpiece passes through slot in both trigger guard and bottom of housing and its stud is snapped into its seat in side plate of trigger housing. Push thumbpiece forward to ready position. Insert hammer loosely in cocked position. Aline pin hole in hammer with pin holes in trigger housing and trigger guard. Insert hammer pin from the right (fig. 45). Swing hammer to the fired position. Place trigger housing on a smooth surface, base of trigger housing down and to the left. Assemble hammer spring housing, hammer spring, and hammer spring plunger into one unit. Place plunger in its seat against hammer, making sure that open side of hammer spring housing is toward safety, and hold assembled parts in a raised position with left thumb and forefinger. With right hand insert trigger into trigger slot so that notch at curved rear surface of finger piece bears against rear of slot in trigger housing. Arrange parts together so that bottom shoulder of hammer spring housing rests in notch just below and forward of trigger pin hole and the two wings of hammer spring housing straddle sear pin. Push down with left thumb on top of rear end of hammer spring housing. At the same time pull trigger rearward with right forefinger and push forward on sear with right thumb, thus compressing hammer spring and bringing trigger pin hole into alignment with holes in trigger housing. Hold this alinement with right hand bracing base of trigger housing against a firm surface. With left hand insert trigger pin up to its head.

d. The following is the quickest method of seating the trigger pin head. It will work on the newest and stiffest rifle. Hold trigger housing in right hand, open side up, top of hammer toward the body. Place right thumb in rear of sear, fingers around front wall of housing. Place left thumb on head of pin. Vigorously attempt to close the right hand and at the same time press down on pin head, seating it.

75. ASSEMBLY OF REAR SIGHT TO RECEIVER.

a. Assemble rear sight base and cover. Insert front lip of cover in its slot at forward end of sight bracket. Raise sight base slightly and with the screwdriver blade of the combination tool held horizontally, press forward on rear lip of sight cover until it snaps into its slot in rear end of sight bracket. Insert the aperture in the slot opening in the rear sight base. Slide the aperture to its extreme forward position. Holding the rear sight base forward against the rear sight cover, insert the elevating pinion through the left side of the receiver, taking care that it meshes with the

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Figure 45 — Assembling Hammer in Trigger Housing

rack on the aperture. Move the rear sight base to the left. Insert the windage knob through the right side of the receiver, and screw it into the rear sight until the "ZERO" mark on the rear sight base registers with the center line of the windage scale on the receiver. Assemble the rear sight nut lock spring and nut lock and place them in position in the windage knob around the threaded end of the elevating pinion with the flange of the nut lock outside. Be sure that the flat cut on the elevating pinion is aligned with the flat on the nut lock. Holding the elevating drum, and using the combination tool, screw the rear sight nut onto the elevating pinion until the desired tension on both the elevating drum and windage knob is obtained.

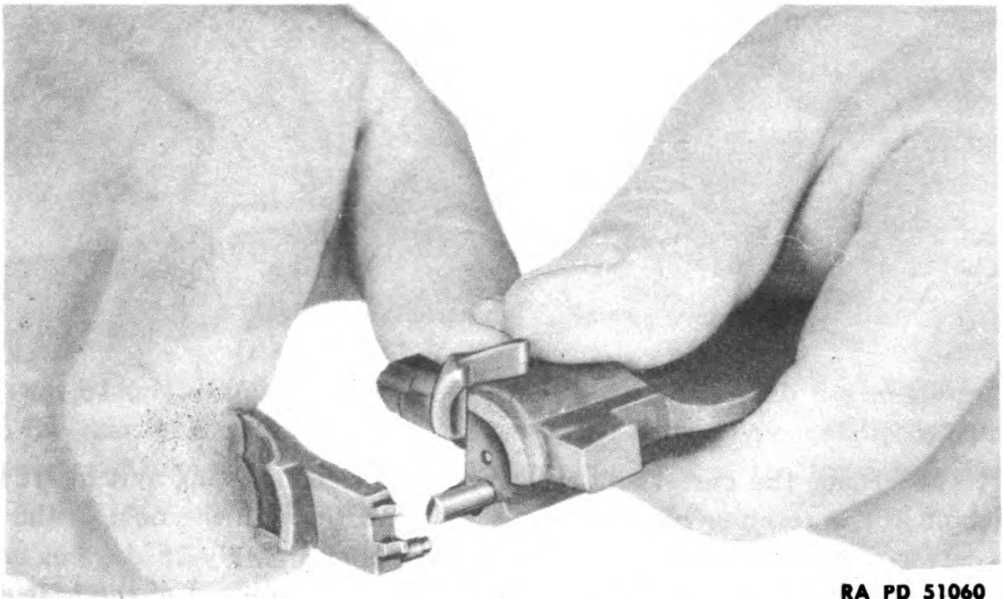
CAUTION: If the nut is screwed too tight, the knobs become locked and cannot be turned. Lower the aperture as far as it will go by turning the elevating pinion. Replace the elevating knob and rotate it to the position noted before disassembling the sight. Holding it in this position, replace the elevating knob screw and tighten. Run aperture as high as possible and complete the tightening of the screw.

76. ASSEMBLY OF BOLT.

- a. If the bolt has been disassembled for inspection or replacement of the firing pin or other parts, it should be reassembled as follows:

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- (1) Insert firing pin into bolt, making sure that tang enters slot in rear of bolt.
- (2) Grasp bolt in left hand, top up, extractor recess to right, holding firing pin in place with little finger.
- (3) Insert ejector with ejector spring attached.
- (4) Insert extractor spring and plunger. Set stud of extractor into its hole in the bolt without forcing it against ejector spring. Place drift of combination tool in left groove of bolt with ejector in ejector cut on face of tool (fig. 46). Press down on combination tool so as to compress ejector spring and aline ejector, then with thumb of left hand push extractor in until extractor plunger is seated. This operation should be performed only with the combination tool.



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Figure 46 – Assembling Ejector and Extractor in Bolt

77. ASSEMBLY OF GAS CYLINDER GROUP (SPLINE TYPE).

- a. Place the open loop of the gas cylinder over the end of the barrel, sliding the cylinder onto the barrel until the splines on the cylinder and barrel are fully engaged.
- b. Place the gas cylinder lock over the barrel with the lug forward and screw into position. In order to bring the lock into correct alinement it may be necessary to strike it a few blows with a fibre or brass hammer.
- c. When the lock is in alinement with the cylinder, insert the cylinder lock screw and screw it tightly into position with the screwdriver end of the combination tool or screwdriver of a similar size.

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d. **Assembly of Gas Cylinder Group (Screw-on Type).** Screw gas cylinder assembly to barrel. Replace front sight and front sight screw.

78. ASSEMBLY OF BARREL AND RECEIVER GROUP.

a. With the barrel and receiver lying on its right side, place the clip latch with its spring in position on the left side of the receiver and insert the latch pin into the receiver from the forward end. Locate the pin in the hole in the forward end of the latch and then, by pressing lightly on the rear end of the latch to relieve the tension of the spring, push the pin through the latch and into position in the rear hole in the receiver (fig. 47).

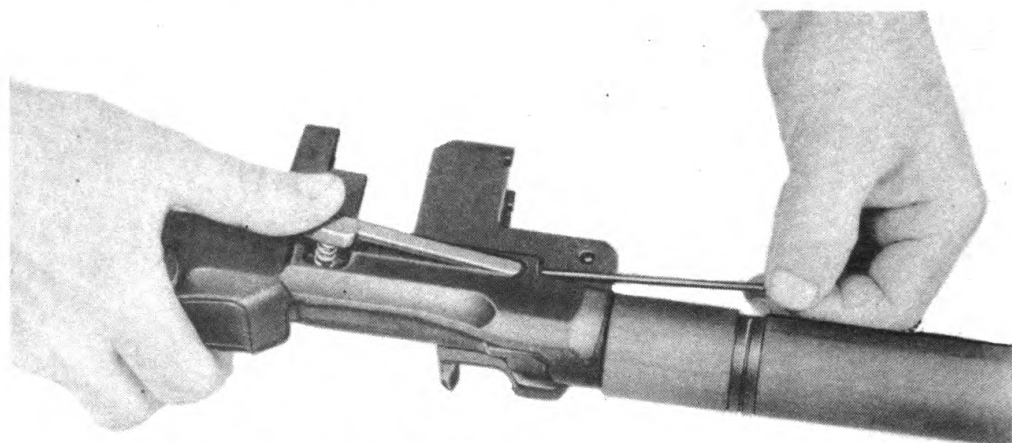


Figure 47 — Assembling Clip Latch

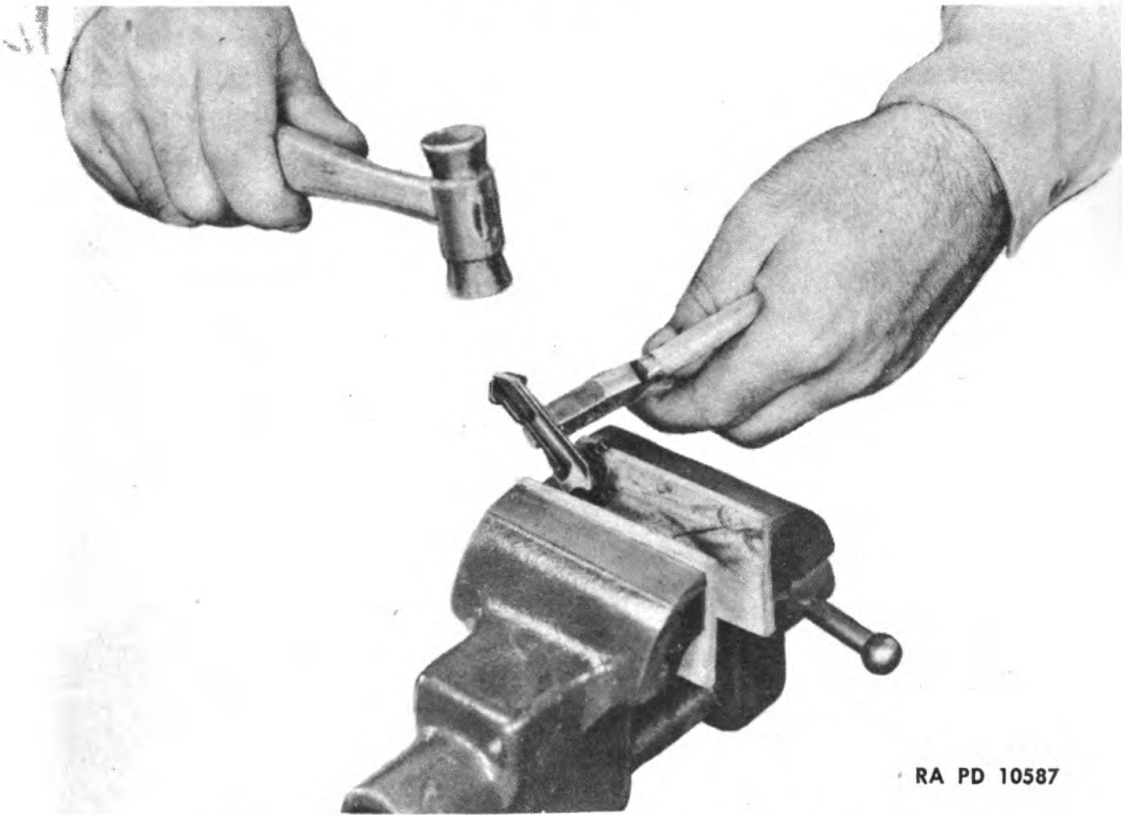
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b. Place the barrel and receiver group right side up, and insert the bolt in the receiver by placing the rear end through the hole in the receiver and tilting the bolt at an angle of approximately 15 degrees until about halfway in the receiver. Then lower the front end of the bolt and push it to the rear.

c. Place the piston end of the operating rod in the gas cylinder and shove it forward. Then move it back until the lug on the rear of the operating rod is opposite the notch in the rear of the slide cut in the receiver. Bring the bolt into position where the lug on the bolt coincides with the recess in the operating rod and move the rod into position. The bolt and operating rod will then be engaged. Push the bolt and rod into the closed position.

d. If the follower slide has been removed from the follower, hook the slide in place in the small end of the follower. Stand the two pieces on end or mount them at an angle in a vise. Deliver a sharp blow on the rear end of the slide. It will then snap back into position on the follower (fig. 48).

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Figure 48 — Assembling Follower and Slide

e. Place the follower with its slide below it, and with the small end to the rear, in the grooved ways in the larger or front pair of lips of the receiver. These ways are located toward the rear of the front lips. Do not insert the follower in the rear pair of lips (fig. 49).

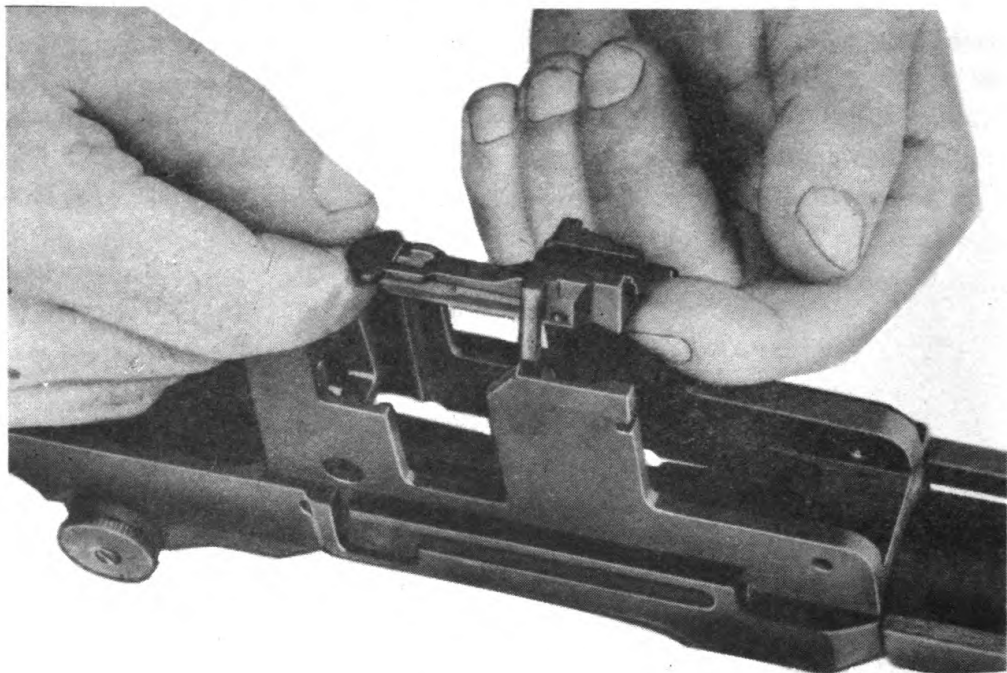
f. Place the bullet guide in position on the receiver, with the hole in the lip of the bullet guide in line with the receiver and the lugs on the opposite end in the corresponding grooves in the lips of the receiver. In this position, the bullet guide projects in an approximate square from the receiver. Do not insert the guide so that its contour conforms closely to the contour of the receiver.

g. Insert the long arm of the operating rod catch (with accelerator) through the clearance slot between the bullet guide and the receiver until the holes in the catch coincide with those in the receiver. Be sure that the accelerator is above the lug on the bullet guide. In this position, the arm of the catch will hook under the lug on the clip latch where it extends through the side of the receiver.

h. Insert the long arm of the follower arm through the clearance slot in the center of the bullet guide and into the grooves in the forward end of the follower; then drop the front end over the lug on the bullet

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guide until the holes in the follower coincide with those in the receiver. Insert the follower arm pin through all four parts, i.e., the receiver, bullet guide, operating rod catch assembly, and the follower, from left to right (receiver group in upside down position).



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Figure 49 — Assembling Follower in Receiver

i. Insert the operating rod spring into the hole in the operating rod, and push forward until the hooks on the end of the follower rod can be engaged with the lugs on the follower arm. Make sure that the hump on the follower rod engages the slot in the operating rod catch. When in this position, the rod closely parallels the lower edge of the barrel. (If a compensating spring is used, first insert the operating rod spring into the operating rod, then assemble the follower rod and compensating spring by twisting the two together until the spring is fully seated on the follower rod. Then insert the end of the follower rod into the operating rod spring.)

79. ASSEMBLY OF MAJOR GROUPS.

a. Place the barrel and receiver group upside down on a table or other flat surface. Insert the ferrule of the stock into the lower band on the barrel and lower the rear end over the receiver.

b. Cock the hammer in the trigger housing and swing the trigger guard downward. It is also advisable to engage the safety by pulling it

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to the rear, so that an inadvertant blow on the trigger will not cause it to fall.

c. Insert the trigger housing group in the receiver squarely with the lower face of the stock (fig. 50). The lugs on the trigger guard will then come into alinement with the corresponding recesses in the rear pair of lips of the receiver. The trigger housing group should then drop into position the full distance into the receiver and stock.

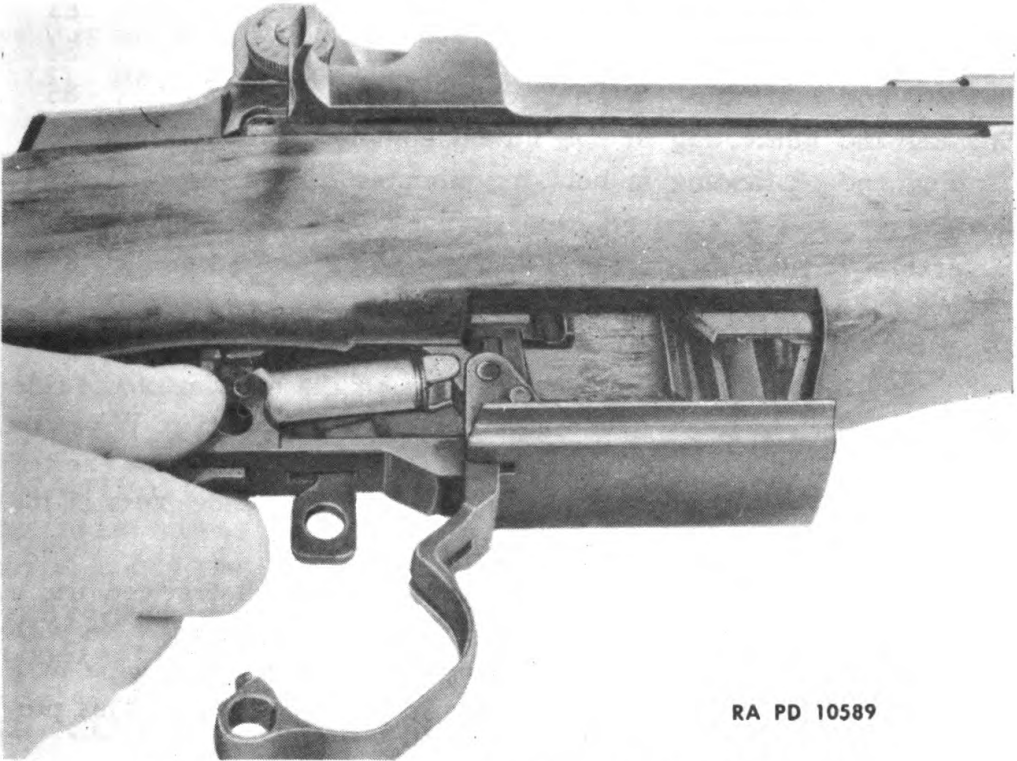


Figure 50 — Assembling Trigger Housing in Receiver

d. Press downward on the trigger guard until its end snaps over end of the trigger housing.

e. **Testing the Rifle.** Test the completed assembly as follows:

(1) Pull back and hold the operating handle to its rearmost position; press down on the follower and allow the bolt to go fully home.

(2) Set the safety in its rearmost position and pull the trigger; the hammer should not fall.

(3) Set the safety in its foremost position and pull the trigger; the hammer should fall.

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Section X

CARE, CLEANING, AND LUBRICATION

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80. CLEANING WOODEN AND METAL SURFACES.

a. **Stock and Other Wood Parts.** Wipe off the exterior of the rifle with a dry cloth to remove dampness, dirt, and perspiration. Wipe the stock and hand guards with OIL, linseed, raw. Care should be exerted to see that the linseed oil is kept away from the operating parts of the rifle, as it will harden and prevent functioning.

b. **Metal Surfaces.** To clean the screw heads and crevices, use a small cleaning brush or stick. To clean the metal surfaces, wipe with a dry cloth to remove moisture, perspiration, and dirt, then wipe with a cloth moistened with OIL, lubricating, preservative, light. This protective film should be maintained at all times.

c. If OIL, lubricating, preservative, light, is not available use OIL, engine, SAE 10, in atmospheric temperatures above approximately 45 F, and OIL, lubricating, for aircraft instruments and machine guns, in atmospheric temperatures below approximately 45 F. In either case, any light grade machine oil may be used in an emergency. Excessive oiling is a waste of oil and results in a collection of dirt which causes friction and wear. In weather below freezing, care should be taken to use oil very sparingly, after careful cleaning of all parts. For care of weapons in extremely cold weather, refer to paragraph 85.

d. Use OIL, lubricating, preservative, light, as a rust-preventive for short periods not to exceed two to six weeks, depending on climatic conditions. FLUID, bore-cleaning, will serve as a short-time preservative in an emergency. For long-time storage, COMPOUND, rust-preventive, heavy, should be used. Refer to paragraph 89.

CARE, CLEANING, AND LUBRICATION

81. CLEANING PREPARATORY TO FIRING.

a. The following procedure will be observed to assure efficient functioning of the rifle:

- (1) Dismount main groups.
- (2) Clean and oil the bore very lightly. Do not oil the chamber.
- (3) Remove any carbon on the gas cylinder plug and piston head.
- (4) Thoroughly clean and lightly oil all metal parts. In cold weather use OIL, lubricating, for aircraft instruments and machine guns. In hot weather use OIL, lubricating, preservative, light.
- (5) Be sure the following parts are well lubricated:
 - (a) Bolt lugs (locking and operating).
 - (b) Bolt guides.
 - (c) Cocking cam on bolt.
 - (d) Compensating spring.
 - (e) Contact surfaces of barrel and operating rod.
 - (f) Operating rod cam.
 - (g) Operating rod guide groove in receiver.
 - (h) Operating rod spring.

CAUTION: Do not apply lubricating grease to the follower slide or the under surface of the bolt, as the introduction of grease into the chamber may lead to the generation of excessive pressure.

(6) Dust should be removed with a dry rag and then the rifle rubbed with a slightly oily rag.

82. CLEANING AFTER FIRING.

a. Guns should be cleaned not later than the evening of the day on which they are fired, preferably immediately after cessation of firing, and should be inspected and cleaned for three days following cessation of firing. Complete cleaning should be done with the groups dismounted.

b. Bore and Chamber.

(1) The bore should be thoroughly cleaned with FLUID, bore-cleaning. This cleaner is a combination solvent and preservative issued for cleaning small arms. When FLUID, bore-cleaning, is not available, the bore should be cleaned with hot soap and water solution, SODA ASH and water solution (1½ spoonfuls per pint of water), hot water alone, or in the absence of these, cold water.

(2) To use FLUID, bore-cleaning, insert a clean patch in the slot in the cleaning rod and saturate it with cleaner. Insert the cleaning rod from the muzzle end and push the patch back and forth through

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the bore several times. Take care that all points of the bore are cleaned from muzzle to chamber. Be sure the patch goes all the way through the bore before the direction is reversed. This will prevent the patch and rod from becoming stuck in the bore. While the bore is wet, a clean brush should be run all the way through and all the way back three or four times to remove any hardened particles in the bore. Remove the brush and run several patches saturated with **FLUID**, bore-cleaning, entirely through the bore, removing them from the breech end, then wipe the cleaning rod dry, and using dry clean patches, thoroughly swab the bore until it is perfectly dry. Saturate a cleaning patch with **FLUID**, bore-cleaning, or with water, in order to dissolve any primer fouling in the chamber. Insert the cleaning patch deep into the slot of the chamber cleaning tool. Lay the tool with patch into the palm of the left hand, close the left hand over the tool, and give the tool about three turns to the right. This will cause the patch to be neatly wrapped around the tool and will cover all its metal surfaces. A slight pressure with the forefinger of the left hand, while turning the tool, will twist the end of the patch much like the finished end of a hand-rolled cigarette, causing the patch to be sufficiently secured to the tool to permit neat entry into the chamber. This insures cleaning the full length of the chamber, prevents the patch from being crushed down to the lower end of the tool, and eliminates the danger of causing rings in the chamber by exposed portions of the cleaning tool. Clean by twisting the patch-covered tool in the chamber. Dry the chamber with dry patches on the cleaning tool. Inspect the chamber visually and by inserting the little finger into the chamber and twisting it. If no discoloration shows on the finger, oil the chamber lightly. This oil should be removed before firing.

(3) Oil the bore and chamber thoroughly, using the cleaning rod and clean patches saturated with **OIL**, lubricating, preservative, light. If this is not available, use **OIL**, lubricating, for aircraft instruments and machine guns.

c. **Gas Cylinder and Gas Cylinder Plug.** Carbon will accumulate due to firing. The frequency of carbon removal is a factor peculiar to individual rifles. Excess deposits of carbon in the rifle manifest themselves by sluggishness in action and failure to feed.

NOTE: If the piston becomes frozen in the gas cylinder due to rust or carbon, soak with penetrating oil for about one hour. Then work the piston loose and shake out. When removed, the piston and gas cylinder should be thoroughly cleaned, oiled, and examined for burs. Also examine the gas port for foreign matter.

(1) **SPLINE TYPE.** To remove accumulated deposits of carbon from

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the gas cylinder, remove the lock screw and remove carbon, using the screwdriver blade of the combination tool. See paragraph 65c. The gas cylinder lock may be removed and the lock screw reinserted in the gas cylinder and threaded in enough to break loose the carbon. The inside of the gas cylinder should be thoroughly wiped clean and oiled at the conclusion of firing. (A few drops of oil placed between the rear gas cylinder lug and the operating rod, with the muzzle tipped down, will be sufficient if firing is contemplated on the next day. Hand operate the rod through a few cycles to distribute the oil properly.) The exterior finish should be cleaned and lightly oiled. The sight should be kept free of dust and dirt.

(2) **SCREW-ON TYPE.** Scrape the carbon from the exposed surface of the front of the gas cylinder, gas cylinder plug, and piston head after extensive firing. Clean the gas cylinder plug and the grooves in the gas cylinder to insure correct seating of the plug. The frequency of this cleaning depends on the amount of firing. A sharp blade instrument, similar to a mess kit knife, should be used to remove the carbon from the gas cylinder plug and piston head. If an abrasive cloth is used care should be taken that the corners of the plug or piston head are not rounded.

(3) **BOTH TYPES.** *Do not remove the gas cylinder for cleaning.* The gas cylinder is cleaned by using the cleaning rod and a patch in the same manner that the bore is cleaned.

83. CLEANING OF BAYONET, BAYONET SCABBARD, AND GUN SLING.

a. **Bayonet and Bayonet Scabbard.** The bayonet and scabbard should be wiped dry of moisture, and the metal parts lightly oiled. Care should be taken to prevent oil from getting on leather or duck coverings of scabbard. Oiling is best done with a slightly oily rag.

b. **Gun Sling.** Occasional applications of SOAP, castile, or SOAP, saddle, will help to keep leather in condition.

84. LUBRICATION.

a. Immediately after cleaning, the rifle will be thoroughly lubricated with OIL, lubricating, for aircraft instruments and machine gun, U. S. Army Spec. 2-27. A protective film of oil should be maintained at all times. Lubrication should be applied lightly, as too much oil collects grit and foreign matter, which will cause undue wear and possible malfunctioning of the rifle.

b. After cleaning and protecting the rifle as just described, place

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it in the gun rack without covering and without a plug in the muzzle or bore. Muzzle covers, gun covers, rack covers, and plugs must not be used because they cause sweating and promote rust; however, when rooms containing racks are being swept, the racks may temporarily be covered to protect the rifles from dust. Covers must be removed after the rooms have been swept.

c. A drop of oil should occasionally be placed on the operating slide, clip latch, and clip latch pin, trigger pin, hammer pin, and hammer plunger.

d. It has been found that the U. S. Rifle, Cal. .30, M1 when exposed to severe conditions of rain or spray from sea water, may occasionally fail to open. This is caused by the excess friction resulting from the washing away of the lubricant by water. To assure the operation of the rifle under such conditions, it is essential that such surfaces be coated with GREASE, rifle, which has excellent resistance to the action of water. With a clean, dry cloth wipe dry the surface of the bolt actuating cam on the operating rod, the locking recesses in the receiver, and the hammer actuating cam on the rear of the bolt. Then lightly coat with GREASE, rifle, by rubbing it on with the finger tip.

NOTE: GREASE, rifle, is to be issued in a small plastic container carried in the rifle butt recess along with the combination tool and oiler. In an emergency, if GREASE, rifle, is available only in bulk, the brush and thong can be removed from the oiler and thong case, and a small quantity of GREASE, rifle, can be put in the space from which the brush and thong were removed.

85. CLEANING AND LUBRICATING IN ARCTIC CLIMATES.

a. Special care, cleaning and lubrication of U. S. Rifle, Cal. .30, M1 and bayonet and scabbard are necessary for proper functioning in arctic climates, or where extremely low temperatures are encountered. In temperatures below freezing, it is necessary that the moving parts of the rifle be kept absolutely free of moisture. It has been found that excess oil on the working parts will solidify to such an extent as to cause sluggish operation or complete failure.

b. Immediately upon bringing indoors, the rifle should be thoroughly oiled, because moisture condensing on the cold metal in a warm room will cause rusting. After the weapon reaches room temperature, it should be wiped free of condensed water vapor and oiled again. Oiling is best done by wiping with a slightly oiled cloth, using OIL, lubricating, for aircraft instruments and machine guns (as specified in TM 9-850).

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c. If the rifle has been fired, it should be cleaned as described in paragraph 82.

d. Before use in temperature below 0 F., the rifle should be completely cleaned with SOLVENT, dry-cleaning. The working parts of surfaces showing signs of wear may be lubricated by rubbing with an oiled cloth. At temperatures above 0 F., the rifle may be oiled lightly after cleaning by wiping with a slightly oiled cloth.

86. CLEANING AND LUBRICATING IN HOT, HUMID CLIMATES.

a. In tropical climates where temperature and humidity are high, or where salt air is present, and during rainy seasons, the weapon should be thoroughly inspected daily and kept lightly oiled when not in use. The groups should be dismounted at regular intervals, and if necessary, disassembled sufficiently to enable the drying and oiling of parts.

b. Care should be exercised to see that unexposed parts and surfaces are kept clean and oiled.

c. OIL, lubricating, preservative, light, should be used for lubrication.

d. Stocks, although made of walnut and treated with linseed oil, sometimes swell due to moisture, thus causing binding of parts in cuts, or the protrusion of wood beyond the metal surfaces, such as butt plate, ferrule, bands, etc. In such cases, relieve the binding and bevel the protrusions as prescribed in section VIII. A light coat of OIL, linseed, raw, applied at intervals and well rubbed in with the heel of the hand, will help to keep moisture out. Allow oil to soak in for a few hours and then wipe and polish wood with a dry clean rag.

NOTE: Care should be taken that linseed oil does not get into the mechanism or on metal parts as it will "gum up" when dry. Stock and hand guard should be dismounted when this oil is applied.

87. CLEANING AND LUBRICATING IN HOT, DRY CLIMATES.

a. In hot, dry climates where sand and dust are apt to get into the mechanism and bore, the weapon should be wiped clean daily, or oftener, if necessary. Groups should be dismounted and disassembled as far as necessary to facilitate thorough cleaning.

b. When the weapon is being used under sandy conditions, all lubricant should be wiped from the weapon. This will prevent sand carried by the wind from sticking to the lubricant and forming an abrasive compound which will ruin the mechanism. Immediately upon leaving sandy terrain, the weapon must be relubricated with OIL, lubricating, preservative, light.

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c. In such climates, wood parts are apt to dry out and shrink, and a *light* application of OIL, linseed, raw, will help to keep wood in condition.

d. Perspiration from the hands is a contributing factor to rust because it contains acid, and metal parts should be wiped dry frequently.

e. During sand or dust storms, the breech and muzzle should be kept covered, if possible.

88. CLEANING OF RIFLES AS RECEIVED FROM STORAGE.

a. Rifles received from storage will, in general, be coated with COMPOUND, rust-preventive, heavy. Use a light oil or SOLVENT, dry-cleaning, to remove all traces of the compound or oil, particular care being taken that all recesses in which springs or plungers operate are cleaned thoroughly. After using the SOLVENT, dry-cleaning, make sure it is completely removed from all parts.

NOTE: Failure to clean the firing pin and the recess in the bolt in which it operates may result in gun failure at normal temperatures, and will most certainly result in serious malfunctions if the rifles are operated in low temperature areas, as COMPOUND, rust-preventive, and other foreign matter will cause the lubricating oil to congeal or frost on the mechanism.

b. SOLVENT dry-cleaning is a petroleum distillate, of low inflammability and noncorrosive, used for removing grease. It is generally applied with rag swabs to large parts and as a bath for small parts. The surfaces must be thoroughly dried immediately after removal of the solvent. To avoid leaving finger marks, which are ordinarily acid and induce corrosion, gloves should be worn by persons handling parts after such cleaning. SOLVENT, dry-cleaning, will attack and discolor rubber.

89. PREPARATION OF RIFLES FOR STORAGE.

a. OIL, lubricating, preservative, light, is the most suitable oil for preserving the mechanism of rifles. This oil is efficient for preserving the polished surfaces, the bore, and the chamber for a period of from 2 to 6 weeks, dependent on the climatic and storage conditions. Rifles in short term storage should be inspected every five days and the preservative film renewed if necessary.

b. COMPOUND, rust-preventive, light, is a semisolid material. This compound is efficient for preserving the polished (metal) surfaces, the bore, and the chamber for a period of 1 year or less, depending on the climatic and storage conditions.

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c. The rifles should be cleaned and prepared with particular care. The bore, all parts of the mechanism, and the exterior of the rifles should be thoroughly cleaned and then dried completely with rags. In damp climates, particular care must be taken to see that the rags are dry. After drying a metal part, the bare hands should not touch that part. All metal parts should then be coated either with OIL, lubricating, preservative, light, or COMPOUND, rust-preventive (heavy or light), depending on the length of storage. (See a and b of this paragraph.) Application of the rust-preventive compound to the bore of the rifle is best done by dipping the cleaning brush in the compound and running it through the bore two or three times. (Cleaning brush must be clean.) Before placing the rifle in the packing chest see that the bolt is in its forward position and that the hammer is released. Then, handling the rifle by the stock and hand guard only, it should be placed in the packing chest, the wooden supports at the butt and muzzle having previously been painted with rust-preventive compound. Under no circumstances should a rifle be placed in storage contained in a cloth or other cover or with a plug in the bore. Such articles collect moisture which causes the weapon to rust.

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Section XI

MATERIEL AFFECTED BY GAS

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90. PROTECTIVE MEASURES.

a. When materiel is in constant danger of gas attack, unpainted metal parts will be lightly coated with engine oil. Instruments are included among the items to be protected by oil from chemical clouds or chemical shells, but ammunition is excluded. Care will be taken that the oil does not touch the optical parts of instruments or leather or canvas fittings. Materiel not in use will be protected with covers as far as possible. Ammunition will be kept in sealed containers.

b. Ordinary fabrics offer practically no protection against mustard gas or lewisite. Rubber and oilcloth, for example, will be penetrated within a short time. The longer the period during which they are exposed, the greater the danger of wearing these articles. Rubber boots worn in an area contaminated with mustard gas may offer a grave danger to men who wear them several days after the bombardment. Impermeable clothing will resist penetration more than an hour, but should not be worn longer than this.

91. CLEANING.

a. All unpainted metal parts of materiel that have been exposed to any gas except mustard and lewisite must be cleaned as soon as possible with SOLVENT, dry-cleaning, or ALCOHOL, denatured, and wiped dry. All parts should then be coated with engine oil.

b. Ammunition which has been exposed to gas must be thoroughly cleaned before it can be fired. To clean ammunition use AGENT, decontaminating, noncorrosive, or if this is not available, strong soap and cool water. After cleaning, wipe all ammunition dry with clean rags. *Do not use AGENT, dry powdered, decontaminating (chloride of lime) (used for decontaminating certain types of materiel) on or near ammunition supplies, as flaming occurs through the use of chloride of lime on liquid mustard.*

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92. DECONTAMINATION.

a. For the removal of liquid chemicals (mustard, lewisite, etc.) from materiel, the following steps should be taken:

(1) PROTECTIVE MEASURES.

(a) For all of these operations a complete suit of impermeable clothing and a service gas mask will be worn. Immediately after removal of the suit, a thorough bath with soap and water (preferably hot) must be taken. If any skin areas have come in contact with mustard, if even a very small drop of mustard gets into the eye, or if the vapor of mustard has been inhaled, it is imperative that complete first-aid measures be given within 20 to 30 minutes after exposure. First-aid instructions are given in TM 9-850 and FM 21-40.

(b) Garments exposed to mustard will be decontaminated. If the impermeable clothing has been exposed to vapor only, it may be decontaminated by hanging in the open air, preferably in sunlight for several days. It may also be cleaned by steaming for two hours. If the impermeable clothing has been contaminated with liquid mustard, steaming for six to eight hours will be required. Various kinds of steaming devices can be improvised from materials available in the field.

(2) PROCEDURE.

(a) Commence by freeing materiel of dirt through the use of sticks, rags, etc., which must be burned or buried immediately after this operation.

(b) If the surface of the materiel is coated with grease or heavy oil, this grease or oil should be removed before decontamination is begun. SOLVENT, dry-cleaning, or other available solvents for oil should be used with rags attached to ends of sticks.

(c) Decontaminate the painted surfaces of the materiel with bleaching solution made by mixing one part AGENT, decontaminating (chloride of lime), with one part water. This solution should be swabbed over all surfaces. Wash off thoroughly with water, then dry and oil all surfaces.

(d) All unpainted metal parts and instruments exposed to mustard or lewisite must be decontaminated with AGENT, decontaminating, non-corrosive, mixed one part solid to fifteen parts solvent (ACETYLENE TETRACHLORIDE). If this is not available, use warm water and soap. Bleaching solution must not be used, because of its corrosive action. Instrument lenses may be cleaned only with PAPER, lens, tissue, using a small amount of ALCOHOL, ethyl. Coat all metal surfaces lightly with engine oil.

(e) In the event AGENT, decontaminating (chloride of lime) is not available, materiel may be temporarily cleaned with large volumes of hot water; however, mustard lying in joints or in leather or canvas webbing

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is not removed by this procedure and will remain a constant source of danger until the materiel can be properly decontaminated. All mustard washed from materiel in this manner lies unchanged on the ground, necessitating that the contaminated area be plainly marked with warning signs before abandonment.

(f) The cleaning or decontaminating of materiel contaminated with lewisite will wash arsenic compounds into the soil, poisoning many water supplies in the locality for either men or animals.

(g) Leather or canvas webbing that has been contaminated should be scrubbed thoroughly with bleaching solution. In the event this treatment is insufficient, it may be necessary to burn or bury such materiel.

(h) Detailed information on decontamination is contained in FM 21-40, TM 9-850, and TC 38, 1941, Decontamination.

Section XII

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93. STANDARD NOMENCLATURE LISTS:

- a. Ammunition, rifle, carbine and automatic gun.. SNL T-1
 - b. **Maintenance.**
 - Cleaning, preserving and lubricating materials; recoil fluids, special oils and miscellaneous related items SNL K-1
 - Soldering, brazing and welding material, gases and related items SNL K-2
 - Tools, maintenance, for repair of small and hand arms, and pyrotechnic projectors SNL B-20
 - Truck, small arms repair, M1—parts and equipment SNL G-72
 - c. Rifle, U. S., cal. .30, M1—parts, equipment and appendages SNL B-21
- Current standard nomenclature lists are as tabulated here. An up-to-date list of SNL's is maintained as the "Ordnance Publications for Supply Index". OPSI

94. EXPLANATORY PUBLICATIONS:

- a. **Maintenance.**
 - Cleaning, preserving, lubricating, and welding materials and similar items issued by the Ordnance Department TM 9-850
 - Decontamination TC 38, 1941 series
 - Defense against chemical attack FM 21-40
 - Ordnance maintenance procedure — materiel inspection and repair TM 9-1100
- b. **Miscellaneous.**
 - Instructions for marking shipments of ordnance general supplies IOSSC-(b)
 - Ordnance storage and shipment chart—Group B—Major items OSSC-B
 - Qualifications in arms and ammunition training allowances AR 775-10
- c. U. S. rifle, cal. .30, M1 FM 23-5

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[A. G. 062.11 (11-6-42)
O. O. 461/25642 O. O. (11-26-42)
TT GRA WAO 12 Jan. 2815000]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

Official:

J. A. ULIO,
Major General,
The Adjutant General.

Distribution:

R 9(2); IBn 9(1); IC 9(4).
(For explanation of symbols, see FM 21-6)

